



Magyarországi földrengések évkönyve  
Hungarian Earthquake Bulletin  
2008

Tóth L., Mónus P., Zsíros T., Bus Z., Kiszely M., Czifra T.

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Magyar Tudományos Akadémia  
Geodéziai és Geofizikai Kutatóintézet  
Szeizmológiai Főosztály



Hungarian Academy of Sciences  
Geodetic and Geophysical Research Institute  
Seismological Observatory

Budapest

# MAGYARORSZÁGI FÖLDRENGÉSEK ÉVKÖNYVE

## HUNGARIAN EARTHQUAKE BULLETIN

2008

TÓTH LÁSZLÓ, MÓNUS PÉTER, ZSÍROS TIBOR,  
BUS ZOLTÁN, KISZELY MÁRTA, CZIFRA TIBOR

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**Hátsó borító:** A magyarországi földrengések fészekmechanizmusai (1969-2008)  
(részletes magyarázat a C mellékletben)

**Back cover page:** Fault plane solutions of Hungarian earthquakes (1969-2008)  
(explanations in Appendix C)

# TARTALOMJEGYZÉK

BEVEZETÉS .....	5
1. ÖSSZEFOGLALÁS .....	7
2. A MAGYARORSZÁGI FÖLDRENGÉS-MEGFIGYELŐ HÁLÓZAT.....	9
Szélessávú állomások.....	9
Rövidperiódusú állomások.....	9
Adatközpont .....	11
Virtuális szeizmológiai hálózat.....	11
3. ESEMÉNYLISTA ÉS FÖLDRENGÉS FÉSZEKPARAMÉTEREK.....	19
A földrengés fészekparaméterek meghatározása .....	19
Sebességmodell.....	19
Eseménylista .....	21
Fészekparaméterek és fázisadatok .....	27
4. JELENTŐS FÖLDRENGÉSEK 2008-BAN .....	51
2008. január 18. – Pápasalamon.....	53
2008. június 25. – Vámospércs .....	57
2008. július 15. – Vámospércs .....	61
2008. november 13. – Kondoros.....	65
2008. november 13. – Kondoros.....	69
HIVATKOZÁSOK.....	73
A MELLÉKLET: <i>Európai Makroszeizmikus Skála (EMS)</i> .....	75
B MELLÉKLET: <i>A világ jelentős földrengései 2008-ban</i> .....	77
C MELLÉKLET: <i>A magyarországi földrengések fészekmechanizmusainak katalógusa (1969-2008)</i> .....	93

# CONTENTS

INTRODUCTION .....	6
1. SUMMARY.....	8
2. SEISMOGRAPH STATIONS IN HUNGARY .....	10
Broadband stations.....	10
Short period stations .....	10
Data centre .....	12
Virtual seismic network.....	12
3. LIST OF ORIGINS AND HYPOCENTER PARAMETERS .....	20
Method for hypocenter parameter determination .....	20
Crustal velocity model.....	20
List of events.....	21
Phase data .....	28
4. SIGNIFICANT EARTHQUAKES IN 2008 .....	52
18 January 2008 – Pápasalamon.....	53
25 June 2008 – Vámospércs .....	57
15 July 2008 – Vámospércs.....	61
13 November 2008 – Kondoros.....	65
13 November 2008 – Kondoros.....	69
REFERENCES.....	73
APPENDIX A: <i>European Macroseismic Scale (EMS)</i> .....	76
APPENDIX B: <i>Significant Earthquakes of the World, 2008</i> .....	78
APPENDIX C: <i>Catalogue of Fault plane solutions of Hungarian earthquakes (1969-2008)</i> .....	94

# BEVEZETÉS

A Pannon-medencében a földrengés aktivitás a lemezperemi területekhez képest mérsékelt, a rengések epicentrumainak eloszlása pedig első pillantásra rendszertelennek látszik. Nehéz eldönteni, hogy a földrengések izolált területeken, vagy szeizmikusan aktív vonalak mentén keletkeznek. Mindenesetre felismerhető néhány terület, ahol viszonylag gyakran fordult elő a múltban földrengés. Ilyenek pl. Eger és környéke, ahol 70 év alatt legalább 16 földrengés és több mint 50 nagyobb utórengés történt. Komárom és Mór környékén, Jászberény, Kecskemét és Dunaharaszti közelében szintén jelentős volt az aktivitás egy-egy bizonyos időszakban. Az alacsony szeizmicitás nem feltétlenül jelenti a földrengések méretének csekélységét: komoly épületkárokat okozó földrengésekről van szó, néhány esetben talajfolyósodást is okozó gyorsulásokkal (pl. 1763 Komárom, M 6.2; 1911 Kecskemét, M 5.6), esetleg a felszínen is megjelenő töréssel (pl. 1834 Érmellék, M 6.2). Ezek a példák azt mutatják, hogy 6.0-6.5 magnitúdójú rengések lehetségesek, de nem gyakoriak a Pannon-medencében (Tóth et al., 2002a).

A földtudományi kutatás fontos eleme a szeizmicitás vizsgálata, annak megismerése, hogy milyen gyakorisággal, hol és mekkora földrengések keletkeznek, továbbá melyek azok a szeizmotektonikai folyamatok, melyek a földrengéseket létrehozzák.

Az általános ismeretszerzésen túlmenően a földrengés elleni védekezéshez is fontos segítséget nyújt a szeizmicitás pontos ismerete. Egy terület földrengés kockázatát csak komplex szeizmológiai, geofizikai, geológiai ismeretek alapján lehet meghatározni. A legfontosabb információ, mely mennyiségileg meghatározza a földrengéskockázatot, a terület földrengés története, illetve a jelenkori rengések ismerete. Ehhez nyújt kardinális fontosságú segítséget a földrengés monitorozás, a földrengések megfigyelése, mérése és paramétereinek meghatározása.

Magyarországon a földrengésmérő állomások száma és minősége 1995-ben érte el azt a szintet, hogy a lakosság által érzékelt valamennyi rengést a hálózat nagy valószínűséggel detektálja. Ez nagyrészt annak a szeizmikus megfigyelő hálózatnak köszönhető, melyet a Nemzetközi Atomenergia Ügynökség javaslatára a Paksi Atomerőmű Rt. létesített az atomerőmű telephely tágabb környezetében.

Jelen kiadványunk célja és tartalma pontosan az, amit a címe is jelez: évkönyv, melyben megtalálható minden olyan adat és ismeret, melyet az év során a magyarországi földrengésekkel kapcsolatban összegyűjtöttünk. A célterület a 45.5-49.0É szélesség és 16.0-23.0K hosszúság által határolt földrajzi tartomány. A teljesség kedvéért azonban a világ jelentős földrengéseinek listája is megtalálható a mellékletben. Reméljük, hogy hasznát látják munkánknak mindazok, akik földtudományi kutatásaikban felhasználói a szeizmicitás adatoknak, de azok is, akik csupán egy-egy földrengéssel kapcsolatos kérdésükre keresnek választ kiadványunkban.

# INTRODUCTION

Seismicity in the Pannonian basin is relatively low comparing to the peripherals and the distribution of earthquake epicenters shows a rather scattered pattern at the first glance. It is particularly difficult to decide whether the epicenters occur at isolated places or along elongated zones however, at several single places earthquakes occur repeatedly. For example, near to Eger (47.9N; 20.4E) at least sixteen earthquakes with more than fifty greater aftershocks occurred over a time interval of some 70 years. Komárom and Mór area (47.4-47.8N; 18.2E), Jászberény (47.5N; 20.0E), Kecskemét (46.9N; 19.7E) and Dunaharaszti (47.4; 19.0E) also produced significant activity over a certain but limited period of time. Moderate seismicity does not necessarily mean moderate size of earthquakes: reports of major earthquakes often refer to heavy building damage, liquefaction (e.g. 1763 Komárom earthquake, M 6.2; 1911 Kecskemét earthquake, M 5.6) and sometimes the possibility of surface fault rupture (e.g. 1834 Érmellék earthquake, M 6.2). These observations indicate that magnitude 6.0-6.5 earthquakes are possible but not frequent in the Pannonian basin (Tóth et al., 2002b).

The study of the recent seismicity is an important element of seismotectonic research. Earthquakes represent the sudden release of slowly accumulated strain energy and hence provide direct evidence of active tectonic processes. However, low and moderate seismicity at intraplate areas generally precludes reliable statistical correlation between epicenters and geological features.

Moreover, as one of the chief contributor to seismic hazard at a given area, detailed knowledge of seismicity also plays an important role in earthquake risk reduction. To be useful, accurately located earthquakes are required. While good information about larger historical earthquakes exists for about the past few hundred years, these are not well enough located. Only modern seismic monitoring networks, capable of locating small magnitude local earthquakes provide the necessary information to close this knowledge gap. The developing database of well-located earthquakes can be used, in one hand, to resolve the tectonic framework and required on the other hand to refine our understanding of the level of seismic risk.

1995 was a milestone in the history of Hungarian seismological observations. The Paks Nuclear Power Plant Ltd. installed a network of high quality digital seismographs, following the recommendations by the International Atomic Energy Agency (IAEA). For the first time, this network made it possible to detect and locate such small magnitude local seismic events that it is very unlikely so as to felt events go undetected in most parts of the country.

The present Earthquake Bulletin is a united annual summary report of all Hungarian earthquake monitoring projects. The information in the Bulletin is based on all available earthquake related data provided by different organizations. The geographic region covered is bounded by latitudes 45.5-49.0N and longitudes 16.0-23.0E.

# 1.

## ÖSSZEFOGLALÁS

A 2008. év szeizmikus szempontból átlagos időszaknak tekinthető. Az év folyamán 116 szeizmikus eseményről szereztünk tudomást a 45.5-49.0N szélességi és 16.0-23.0E hosszúsági koordináták által határolt területen, amelyek közül 75 volt természetes eredetű földrengés, 41 robbantás. Az események mérete a  $0.1 \leq M_L \leq 4.0$  lokális magnitúdó tartományba esett.

Az év folyamán 5 olyan földrengés volt, melyet a lakosság is érzett. A Pápa, Kondoros és Békés környékén keletkezett rengések mindegyike ismert forrászónához köthető.

A legnagyobb földrengés intenzitás, melyet az év folyamán Magyarország területéről jelentettek 4-5 EMS fokozat volt. Épületkárokról az év folyamán nem kaptunk jelentést.

Időrendben az első érezhető rengés január 18-án reggel keletkezett Pápa közelében. A 2.7  $M_L$  magnitúdójú földrengés intenzitása 4 EMS fokra becsülhető (Pápasalamon).

Június 25-én éjjel kisebb, 2.5  $M_L$  magnitúdójú földrengést éreztek Hajdú-Bihar-megyében. A rengés intenzitása 4-5 EMS fokra becsülhető, de csak Vámospércs településen érezték. A rengést három héttel később, július 15-én kisebb utórengés (1.9  $M_L$ ) követte, mely szintén érezhető volt.

Békés-megyében két rengést érezték november 13-án. Egy 3.7  $M_L$  magnitúdójú rengés reggel, a másik (3.5  $M_L$ ) valamivel később, a déli órákban pattant ki. Mindkét rengés becsült intenzitása 4-5 EMS.



# 1.

## SUMMARY

2008 was a quiet-average year for Hungarian seismicity. Out of the 116 seismic events ( $0.1 \leq M_L \leq 4.0$ ) located within the area bounded by latitudes 45.5-49.0N and longitudes 16.0-23.0E 75 were identified as natural earthquakes, 41 were known quarry blasts.

Five earthquakes were reported as felt. The earthquakes of Pápa, Kondoros and Békés can be connected to known source zones.

The highest magnitude assigned to a shock was 4.0  $M_L$  while the highest intensity reported during the year was 4-5 EMS. No building damage was reported during the year.

Reviewing the more notable events of the year in chronological order, the first felt earthquake was reported from Veszprém County near Pápa. The shock was felt in a relatively small area of 100-150 km<sup>2</sup> and produced reports of 4 EMS from Pápasalamon

On June 25<sup>th</sup> night, a small magnitude earthquake (2.5  $M_L$ ) was reported from Vámospércs, Hajdú-Bihar County, E Hungary. The shock was felt (EMS 4-5) only at the epicenter area. Some three weeks after the previous earthquake, another small aftershock (1.9  $M_L$ ) was reported (4-5 EMS) from the same area

Two earthquakes were reported from Békés County on November 13<sup>th</sup>. The 3.7  $M_L$  and 3.5  $M_L$  earthquakes were felt only on a very small area. The highest intensity values (4-5 EMS) were reported from Kondoros.

## 2.

# A MAGYARORSZÁGI FÖLDRENGÉS-MEGFIGYELŐ HÁLÓZAT

2008-ban 15 szeizmográf állomást működtetett Magyarországon az MTA Geodéziai és Geofizikai Kutatóintézet és a GeoRisk Földrengekutató Intézet Kft. A két szervezet által kötött megállapodás értelmében az összes mért adatot korlátozás nélkül megosztják egymással. Az adatok együttes feldolgozásának köszönhetően a földrengések paraméterei jóval pontosabban, gyorsabban, megbízhatóbban határozhatók meg (2.1. Táblázat és 2.1. ábra).

### *Szélessávú állomások*

Az év folyamán 6 szélessávú szeizmológiai állomás működött (BEHE, BUD, PKSM, PSZ, SOP, TRPA), melyek mindegyikén az érzékelő egy 3 komponenses szélessávú Streckeisen STS-2 szeizmométer. Az érzékelő jele a PKSM állomáson egy Quanterra Q380 berendezésen keresztül, a többi helyen pedig EarthData PS-6-24 digitalizáló egységen át jut a SeisComp szoftverrel felszerelt adatgyűjtő számítógépre. Mindegyik állomás internet összeköttetéssel rendelkezik, így az adatok közel valós időben, egy erre a célra kifejlesztett protokollal (SeedLink) felhasználásával jutnak el a budapesti adatközpontba, ahol a feldolgozás és archiválás történik. Az adatközpontban az adatok átlagos késése a valós időhöz képest 10 másodperc körüli. A helyszínen tárolt adatok bizonyos idő elteltével törlődnek.

### *Rövidperiódusú állomások*

A 9 rövidperiódusú állomás mindegyikén Lennartz LE-3D 1 s sajátperiódusú 3 komponenses szeizmométer és Lennartz MARS88 digitalizáló és adatgyűjtő működik, folyamatos regisztrálással.

Öt rövidperiódusú állomáson (PKS2, PKS6, PKS7, PKS9, PKS9) az adatok átmeneti tárolása a helyszínen, magneto-optikai lemezeken történik. A lemezek havi cseréjével az adatok legalább két nap, legfeljebb egy hónap késéssel kerülnek az adatközpontba.

Négy állomás (PENC, PKSG, PKST, RHK3) működése eltér a többi rövidperiódusú állomásától. Az érzékelő és digitalizáló ugyanaz, de az adatok a helyszínen működő SeisComp rendszerű számítógépbe jutnak, ahol annak merevlemezén tárolódnak, és az Interneten keresztül eljutnak a budapesti adatközpontba, hasonlóan a szélessávú állomásokhoz. Azonban itt az alkalmazott konfiguráció és a működés részben eltér a szélessávú állomásokétól, ebből adódóan az adatok késése valamivel nagyobb, 10-30 perces. A helyszínen tárolt adatok bizonyos idő elteltével itt is automatikusan törlődnek (2.2. ábra).

Az RHK3 állomásról az adatok telefonos kapcsolat segítségével jutnak el az adatközpontba. A telefonos adatgyűjtés ezen állomásról félóránként történik.

## 2.

### SEISMOGRAPH STATIONS IN HUNGARY

In 2008, there were 15 seismograph stations in Hungary operated by Geodetic and Geophysical Research Institute, Hungarian Academy of Sciences and GeoRisk Earthquake Research Institute Ltd. Based on an agreement, the two institutions shared all data recorded in all seismic stations without limitations and operated a common data centre (Table 2.1 and Fig. 2.1).

#### *Broadband stations*

Six broadband stations (BEHE, BUD, PKSM, PSZ, SOP, TRPA) were running during the year. All of these stations have Streckeisen STS-2 very broadband seismometers as sensors. Each station is equipped with EarthData PS-6-24 digitizer except PKSM where a Quanterra Q380 unit serves as a digitizer. Linux PC's with SeisComP software have been used as data acquisition systems. All stations are accessible via Internet in support of near real time data transfer. The average data latency at these stations is typically less than 10 s. SeedLink protocol is used for data collection and all continuous data is archived in the data centre.

#### *Short period stations*

Each of the nine short period stations consist of a three component short period seismometer, a digital recorder and time signal receiver. The seismometers used are the LE-3D three directional compact size high sensitivity 1 Hz geophones. The digital acquisition system is the MARS88 recorder. Continuous data are recorded at each short period station.

In case of five stations (PKS2, PKS6, PKS7, PKS9, PKSN) the data is recorded and temporarily stored on-site on rewritable magneto-optical disks, which are collected and transferred to the data center on a monthly basis.

The configuration at four stations (PENC, PKSG, PKST, RHK3) is somewhat different from the rest of the short period stations. Having the same sensor and digitizer, continuous data is recorded on a SeisComP PC connected to the MARS88 data logger. The stations have near real-time data access via Internet using the SeedLink protocol. Data latency is between 10 and 30 minutes due to the operation schedule of the data converter (Fig. 2.2).

Station RHK3 is accessible via telephone modem; continuous data is routinely collected on 'half an hour' basis.

*Adatközpont (www.foldrenges.hu)*

Az összes mérőállomáson regisztrált adatot a budapesti adatközpontban gyűjtjük és dolgozzuk fel. Az adatközpont nem csak gyűjti a szeizmológiai adatokat, de több formában szolgáltatja is azokat, elsősorban elektronikusan az Interneten keresztül.

Minden állomás digitális adataiból napi szeizmogramok készülnek kép formátumban. A képi szeizmogramok egyrészt az érdeklődők számára készülnek, másrészt a működés ellenőrzését szolgálják. A mérőállomással fennálló adatátviteli módtól függően ezek a szeizmogramok lehetnek közel valós idejűek, vagy a direkt kommunikációval nem rendelkező állomások esetében több napos késéssel készülők.

Az események fázisainak körültekintő manuális kimérése alapján készül havonta a fázisadatokat (kimérési adatokat) tartalmazó jelentés. E jelentéseket elküldjük a szomszédos országok szeizmológiai intézményeinek, valamint a nemzetközi adatközpontoknak.

A fázisadatok felhasználásával – a saját adatokat kiegészítve a szomszédos országok szeizmológiai intézményeinek hasonló adataival – havonta eseménylista készül (Havi Jelentés), mely a helyi és regionális földrengések hipocentrum adatait tartalmazza.

Kétoldalú megállapodások alapján néhány szomszédos országgal, illetve nemzetközi adatközpontokkal (GEOFON, ORFEUS) zajlik valós idejű adatcsere. A valós idejű hullámforma adatok a budapesti adatközpont SeedLink szerverén keresztül érhetők el. Mód van azonban – bizonyos korlátokkal – múltbeli hullámforma adatok kiszolgáltatására is az adatközpontban működtetett AutoDRM rendszer segítségével (autodrm@seismology.hu).

A mérési adatok, szeizmogramok, a kiértékelés eredményei nagyrészt nyilvánosan elérhetők az interneten a [www.foldrenges.hu](http://www.foldrenges.hu) oldalon.

Átlagos zaj- (talajnyugtalanosság) viszonyokat feltételezve a magyarországi szeizmológiai hálózat észlelési képessége  $ML=1.5-2.0$  magnitúdó körül van (2.3. ábra). Ennek számítása azon feltételezésen alapul, hogy az eseményt legalább négy mérőállomás érzékeli, mely a helymeghatározáshoz szükséges minimális állomásszám. Az ország középső részén kissé alacsonyabb, a határok környékén kissé magasabb ez az érték. Ez azt jelenti, hogy az ÉK-i területeket kivéve, a lakosság által érzékelt valamennyi rengést a hálózat nagy valószínűséggel detektálja.

*Virtuális szeizmológiai hálózat (HUNRENG)*

A kommunikáció fejlődése, a valós idejű adatátvitel és az azonos adatátviteli protokoll (SeedLink) Európa-szerte elterjedt használata lehetővé tette, hogy külföldi állomások adatait is fogadjuk közel valós időben ugyanúgy, mint a saját állomásainkét. A külföldi állomások mérési adatainak felhasználásával a földrengések paraméterei még pontosabban, megbízhatóbban számíthatók ki. Ezen kívül a nagyszámú állomás adataához való valós idejű hozzáférés lehetővé tette *automatikus földrengésjelző rendszerünk* elindítását. Ez a rendszer automatikusan képes felismerni a földrengéseket, és azok paramétereit néhány percen belül ki is számítja. A térképen és listán automatikusan megjelenített földrengés információ elsősorban gyors tájékoztatásul szolgál (2.4. ábra és 2.2. Táblázat).

*Data Centre (www.foldrenges.hu)*

All recorded data is transmitted to and processed at the *Data Centre* in Budapest. The data that are collected by the *Data Centre* are published in a variety of formats and publications are available electronically via the Internet.

Using digitally recorded data, analogue “live seismograms” are calculated for each station. The main purposes of the “live seismograms” are feeding public interests in one hand, and rapid visualization of the operational status and quality check of the stations on the other. The delay of the “live seismograms” varies from near real time to several days depending on the communication category of the station.

A careful manual offline analysis is used for event identification and picking the phases on each recorded seismogram. Seismogram readings (phase data) are disseminated by email to partner institutions and international data centers.

Merging the phase data of the Hungarian network and the same kind of available data sets from neighbor countries, preliminary event lists are calculated on monthly schedule. Based on technical and operational statistics of the stations, list of local and regional seismic events and their hypocenter information, *Monthly Reports* are compiled.

Real time data from broadband stations can be accessed through a SeedLink server operated at the data centre. Real time data are provided to international data centers (ORFEUS, GEOFON) and some other partner institutions. Waveform data is also available through an AutoDRM service (autodrm@seismology.hu).

The estimated detection capabilities of the present network with average noise conditions, supposing that at least four stations is needed for origin determination, is typically around 1.5-2.0  $M_L$ , somewhat lower in the middle of the country and a little higher towards the border regions. (See Fig. 2.3) This means that in most parts of the country, not including the NE territory, it is very unlikely that felt events go undetected.

*Virtual network (HUNRENG)*

Development in communication technology and standardized communication protocols, software packages made available to access near real time data of stations beyond the national network. SeedLink and SeisComP developed at GEOFON became a kind of standard all over Europe.

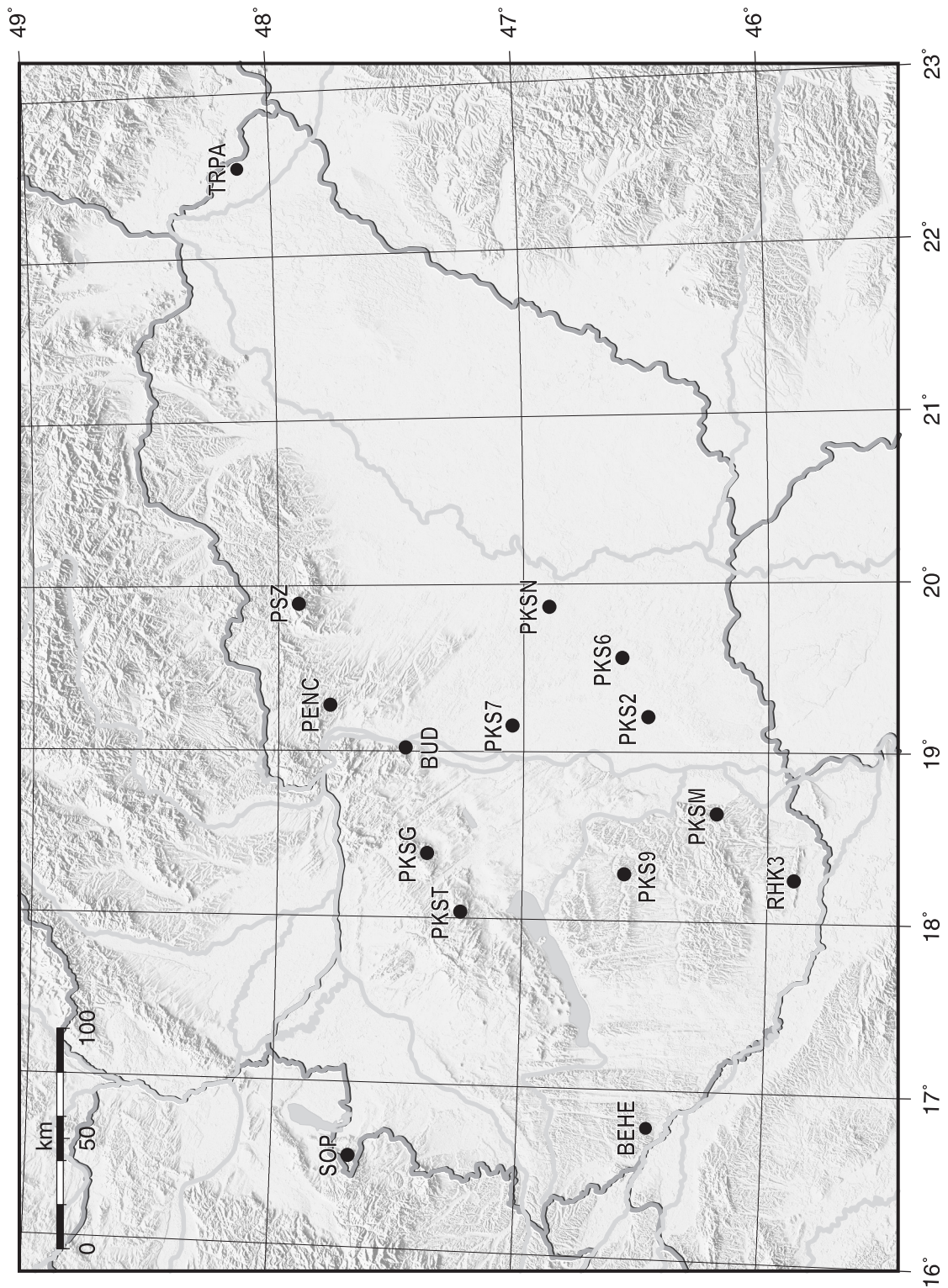
The larger pool of data provided by an extended, “virtual network” of seismic stations helps to have faster and more accurate earthquake locations and parameter determinations. In addition, near real time access to data from large number of stations makes possible to operate automatic rapid earthquake alarm systems. Automatically generated earthquake lists and epicenter maps are the main product of such systems.

The present configuration of the experimental virtual network *HUNRENG* is shown in Fig. 2.4 and Table 2.2.

**2.1. Táblázat** Szeizmológiai állomások, műszerek és alapkőzet  
**Table 2.1.** Seismic stations, instrumentation and lithology

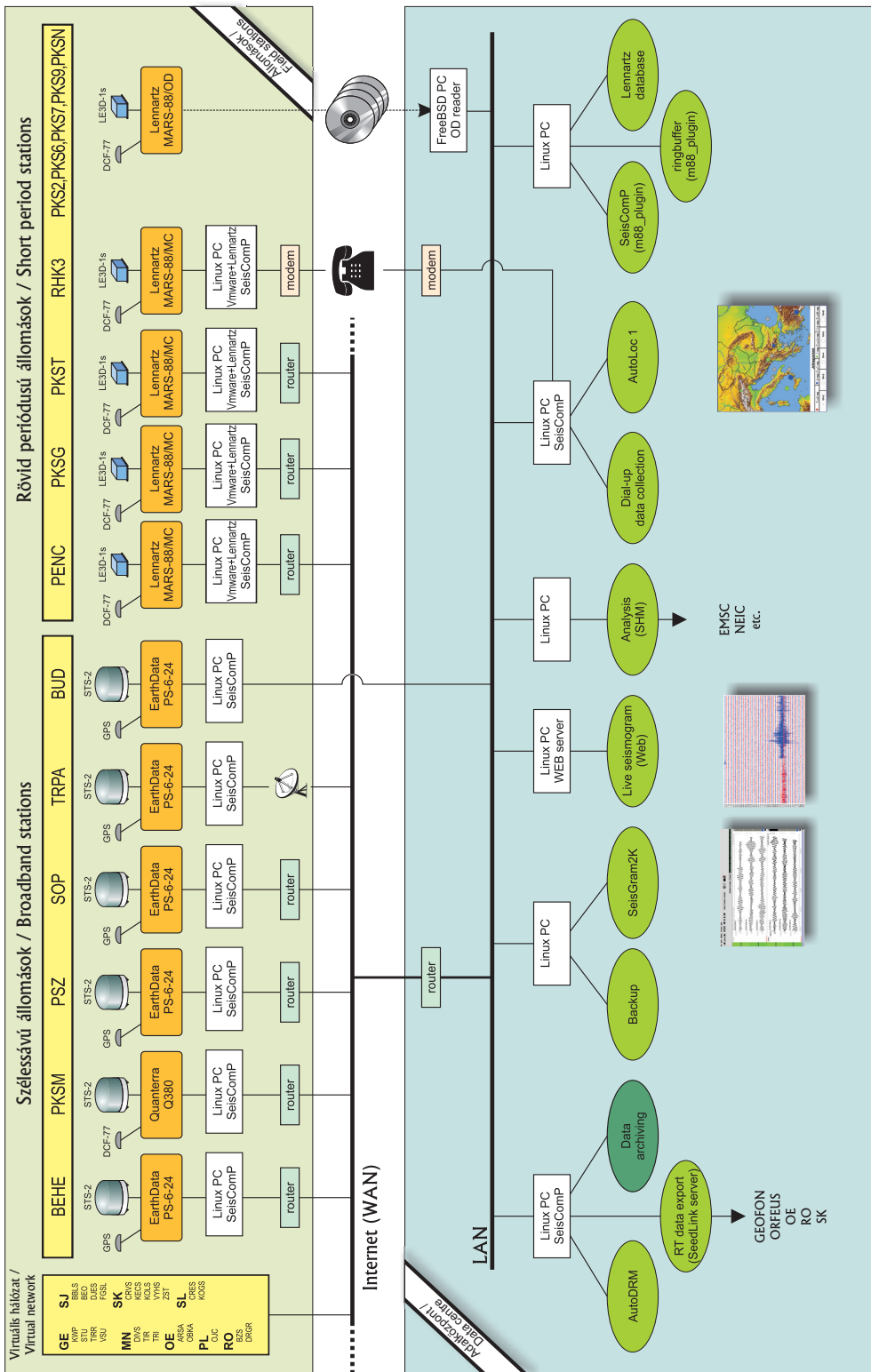
Jel Helység Code Location	Szélesség Latitude (N)	Hosszúság Longitude (E)	Magasság Elevation (m)	Alapkőzet Foundation	Állomás típusa Station type (1)	Érzékelő típusa Sensor type (2)	Regisztrálás Adatgyűjtő Recording mode Equipment (3)	Szerv. Org. (4)
BEHE Becsehely	46,4702	16,7755	298	üledék alluvium	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GGKI
BUD Budapest	47,4836	19,0239	196	dolomit dolomite	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GGKI
PENC Penc	47,7905	19,2817	250	üledék alluvium	3C SP	LE-3D	D-C; MARS-88MC+ SeisComP PC	GR
PKS2 Kecel	46,4920	19,2131	106	homok sand	3C SP	LE-3D	D-C; MARS-880C	GR
PKS6 Bócsa	46,5998	19,5645	120	homok sand	3C SP	LE-3D	D-C; MARS-880C	GR
PKS7 Kunszentmiklós	47,0473	19,1609	95	agyag mud	3C SP	LE-3D	D-C; MARS-880C	GR
PKS9 Tamási	46,5870	18,2789	240	löss loess	3C SP	LE-3D	D-C; MARS-880C	GR
PKSG Gánt	47,3918	18,3907	200	dolomit dolomite	3C SP	LE-3D	D-C; MARS-88MC+ SeisComP PC	GR
PKSM Mórággy	46,2119	18,6413	170	gránit granite	3C BB	STS-2	D-C; Q380+ SeisComP PC	GGKI/ GR
PKSN Nyárlőrinc	46,8972	19,8673	110	homok sand	3C SP	LE-3D	D-C; MARS-880C	GR
PKST Tés	47,2590	18,0343	473	dolomit dolomite	3C SP	LE-3D	D-C; MARS-88MC+ SeisComP PC	GR
PSZ Piszkéstető	47,9184	19,8944	940	andezit andesite	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GEO FON /GGKI
RHK3 Tenkes	45,8885	18,2521	420	mészkö limestone	3C SP	LE-3D	D-C; MARS-88MC+ SeisComP PC	GR
SOP Sopron	47,6833	16,5583	260	gneisz gneiss	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GGKI
TRPA Tarpa	48,1304	22,5391	113	andezit andesite	3C BB	STS-2	D-C; PS-6-24+ SeisComP PC	GGKI

- (1) 3C – 3 komponenses szeizmométer / three component seismometer  
 SP – rövid periódusú szeizmométer / short period seismometer; BB – széles sávú szeizmométer / broad band seismometer
- (2) STS-2 – Streckeisen széles sávú szeizmométer / Streckeisen broad band seismometer  
 LE-3D – Lennartz 3 komponenses 1Hz-es geofon / Lennartz three directional 1Hz geophone
- (3) D – digitális / digital; C – folyamatos felvétel / continuous recording; PS-6-24 – Earth Data digitalizáló / Earth Data digitizer  
 Q-380 – Quanterra adatgyűjtő rendszer / Quanterra data acquisition system;  
 SeisComP – GEOFON Seismological Communication Processor  
 MARS-88 – Lennartz adatgyűjtő / Lennartz data acquisition system
- (4) GGKI – MTA Geodéziai és Geofizikai Kutatóintézet / Geodetic and Geophysical Research Institute, HAS  
 GR – GeoRisk Földrengéskutató Intézet Kft. / GeoRisk Earthquake Research Institute Ltd.



**2.1. ábra** A magyarországi szeizmológiai állomáshálózat 2008-ban (részletek: 2.1. Táblázat)

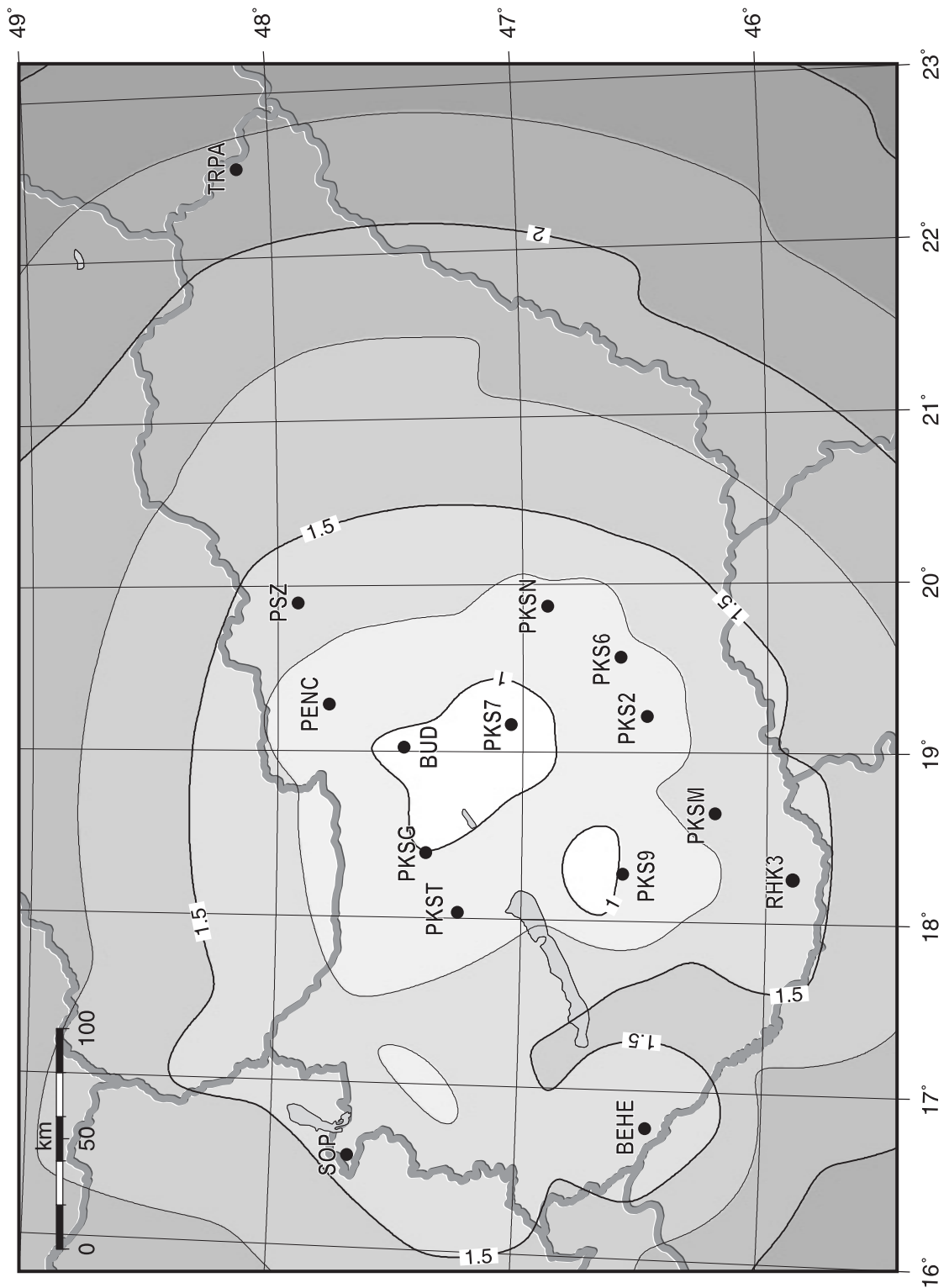
**Figure 2.1.** Seismograph station network in Hungary in 2008 (See Table 2.1. for details)



2.2. ábra A magyarországi szeizmológiai hálózat felépítése

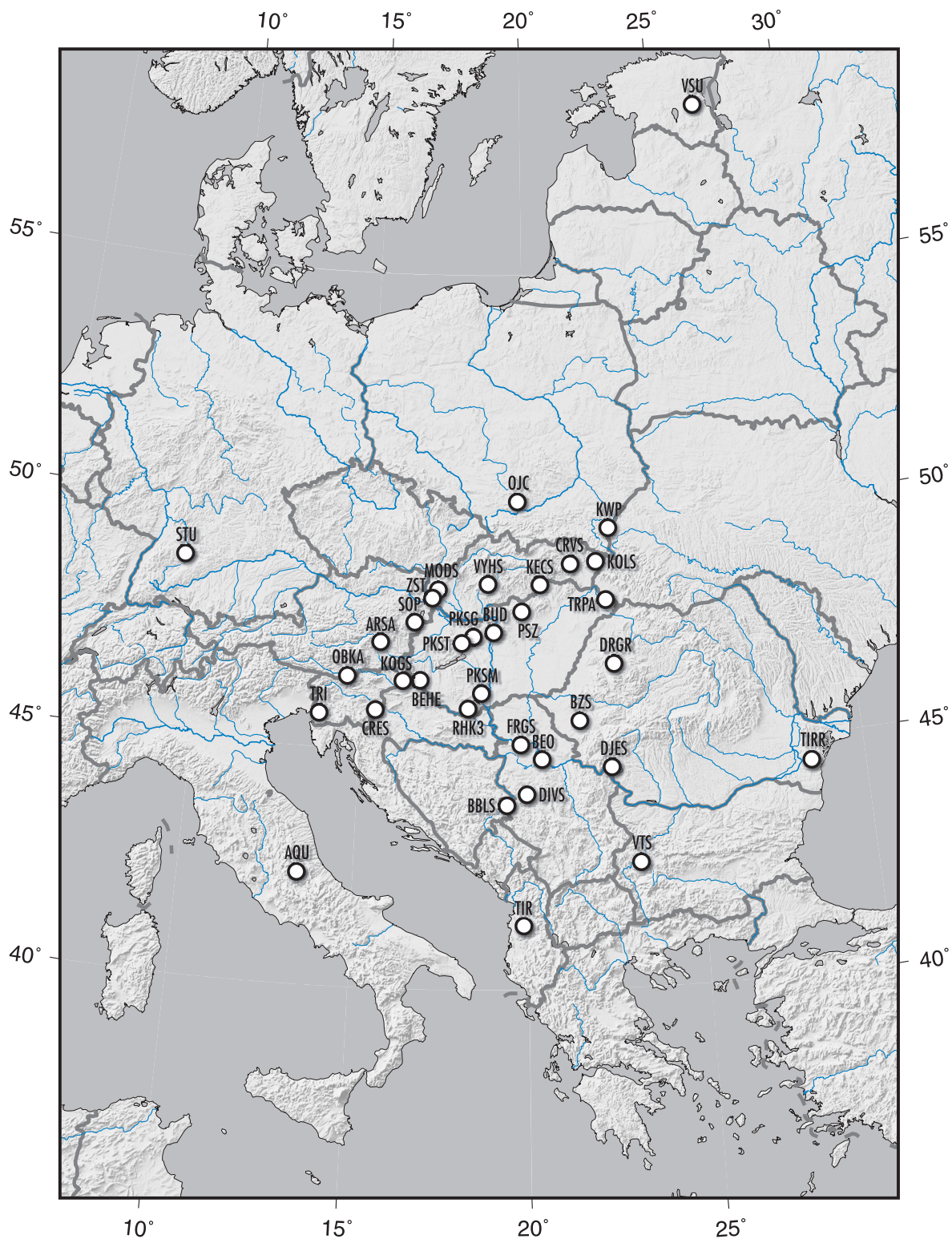
Figure 2.2. Structure of the Hungarian seismograph network





**2.3. ábra** Érzékenységi küszöb átlagos zajviszonyokat feltételezve. Az izovonalak Richter-féle lokális magnitúdót (ML) mutatnak.

**Figure 2.3.** Detection capability at average noise conditions. Contour values are local Richter magnitudes (ML)



2.4. ábra HUNRENG virtuális szeizmológiai hálózat állomásai

Figure 2.4. Seismic stations used for HUNRENG virtual seismic network

**2.2. Táblázat** HUNRENG virtuális szeizmológiai hálózat külföldi állomásai  
**Table 2.2.** Supplementary seismic stations used for HUNRENG virtual seismic network

Állomáskód Station code	Az üzemeltető hálózat / Operating network		Ország / Country
	Kódja / Code *	Neve / Name	
KWP	GE	GEOFON	Lengyelország / Poland
SANT			Görögország / Greece
STU			Németország / Germany
TIRR			Románia / Romania
VSU			Észtország / Estonia
AQU	MN	MEDNET	Olaszország / Italy
DIVS			Szerbia / Serbia
TIR			Albánia / Albania
TRI			Olaszország / Italy
VTS			Bulgária / Bulgaria
ARSA	OE	Osztrák Szeizmológiai Hálózat / Austrian Seismic Network	Ausztria / Austria
OBKA			
OJC	PL	Lengyel Szeizmológiai Hálózat / Polish Seismological Network	Lengyelország / Poland
BZS	RO	Román Szeizmológiai Hálózat / Romanian Seismic Network	Románia / Romania
DRGR			
BBLS	SJ	Szerb Szeizmológiai Hálózat / Serbian Seismological Network	Szerbia / Serbia
BEO			
DJES			
FRGS			
CRVS	SK	Szlovák Nemzeti Szeizmológiai Hálózat / Slovak National Seismic Network	Szlovákia / Slovakia
KECS			
KOLS			
MODS			
VYHS			
ZST			
CRES	SL	Szlovéniai Szeizmológiai Hálózat / Slovenia Seismic Network	Szlovénia / Slovenia
KOGS			

(\*) FDSN (International Federation of Digital Seismograph Networks) kód

### 3.

## ESEMÉNYLISTA ÉS FÖLDRENGÉS FÉSZEKPARAMÉTEREK

### A FÖLDRENGÉS FÉSZEKPARAMÉTEREK MEGHATÁROZÁSA

A fészekparaméterek rutinszerű kiszámításához a HYPO71PC programot használtuk (Lee and Lahr, 1975). Az eredeti kódot kissé módosítottuk a könnyebb kezelhetőség érdekében, és kiegészítettük egy rutinnal, amely a Richter-féle lokális magnitúdót ( $M_L$ ) számolja Bakun és Joyner (1984) módszerével.

A fészekparaméterek meghatározásánál mind a magyarországi, mind a szomszédos országok állomásainak adatait felhasználtuk. A számításnál az egyes állomások kimérési adatait az epicentrumtól való távolsággal fordított arányban súlyoztuk. Néhány esetben, amikor elegendő P fázis adat állt rendelkezésre, az S fázis adatokat nem használtuk fel.

### SEBESSÉGMODELL

A számításnál felhasznált 3 rétegű sebességmodell több száz helyi és közeli földrengés kéregfázis adatain alapul (Mónus, 1995).

<i>Sebesség (<math>v_P</math>) [km/s]</i>	<i>Mélység [km]</i>	<i>Vastagság [km]</i>	$v_P/v_S$
5,60	0,0	20,0	1,78
6,57	20,0	11,0	
8,02	31,0	$\infty$	

### 3.

## LIST OF ORIGINS AND HYPOCENTER PARAMETERS

#### METHOD FOR HYPOCENTER PARAMETER DETERMINATION

HYPO71PC (Lee and Lahr, 1975) was used for the routine calculation of hypocenter parameters. The original program has been modified and a routine for Richter local magnitude calculation implemented. For the magnitude calculations, the method published by Bakun and Joyner (1984) has been used.

The hypocenter parameters have been calculated using phase readings of seismological stations from Hungary and from the adjoining countries. However, a distance weighting has been applied, phase data from stations with epicenter distance greater than 450 km have been weighted out. In some cases, when sufficient number of P readings were available, S phase readings were not used in the calculations.

#### CRUSTAL VELOCITY MODEL

The three-layer crustal velocity model used in the hypocenter calculations has been derived from crustal phase travel times of several hundreds of local earthquakes (Mónus, 1995).

<i>Velocity (<math>v_P</math>)</i> <i>[km/s]</i>	<i>Depth</i> <i>[km]</i>	<i>Thickness</i> <i>[km]</i>	$v_P/v_S$
5.60	0.0	20.0	1.78
6.57	20.0	11.0	
8.02	31.0	$\infty$	

## ESEMÉNYLISTA / LIST OF EVENTS

Nap	Kipattanási idő (UTC)	Földrajzi koordináták		Mélység (km)	ML	I <sub>MAX</sub> (EMS)	Helyszín
	óó pp mp	Lat	Long				
Day	Origin time UTC	Geographic coordinates		Depth (km)	ML	I <sub>MAX</sub> (EMS)	Locality/Region
	hr mn sec	Lat	Long				
JANUÁR / JANUARY, 2008							
07	7:28:03.2	46.188N	16.415E	11	3.0	-	Croatia
18	8:14:37.8	47.216N	17.434E	12	2.7	4	Pápasalamon
30	14:54:21.9	47.745N	16.154E	4	3.9	-	Austria
FEBRUÁR / FEBRUARY, 2008							
01	14:45:22.3	47.104N	17.924E	9	0.8	-	Kádárta
07	16:45:31.4	45.867N	20.663E	19	3.9	-	Romania
08	8:07:08.1	47.461N	18.210E	0	1.2	-	Bokod (expl.)
09	15:00:01.9	48.627N	20.102E	10	2.1	-	Slovakia
14	9:34:04.7	47.452N	18.713E	10	0.9	-	Etyek
15	10:07:55.3	48.379N	19.827E	0	1.6	-	Slovakia (expl.)
19	9:23:40.7	47.937N	19.819E	0	1.9	-	Mátraverebély (expl.)
MÁRCIUS / MARCH, 2008							
14	10:12:18.5	48.339N	19.840E	0	2.3	-	Slovakia (expl.)
19	7:05:48.2	46.481N	17.856E	10	2.0	-	Somodor
28	11:45:38.5	48.194N	19.799E	0	1.5	-	Somoskő (expl.)
28	12:16:12.0	48.000N	19.241E	0	1.9	-	Csesztve (expl.)
31	10:02:44.0	48.359N	19.854E	0	2.1	-	Slovakia (expl.)
ÁPRILIS / APRIL, 2008							
01	10:09:41.6	47.940N	19.797E	20	1.5	-	Mátraverebély
02	13:38:47.6	47.142N	17.959E	10	0.8	-	Gyulafirátót
04	16:34:13.9	47.348N	18.428E	10	2.1	-	Gánt
04	16:37:20.9	47.437N	18.354E	7	0.8	-	Oroszlány
06	22:16:03.1	46.256N	16.718E	14	2.1	-	Croatia
18	12:00:22.5	48.856N	20.947E	0	2.2	-	Slovakia
21	8:31:49.3	47.926N	19.836E	0	1.5	-	Mátraszentimre (expl.)
21	12:26:10.9	48.063N	20.226E	0	1.7	-	Szentdomonkos (expl.)
24	10:27:28.7	48.136N	20.489E	0	2.1	-	Mályinka (expl.)
25	14:53:18.0	45.545N	18.517E	0	2.5	-	Croatia
26	19:19:11.9	46.461N	16.958E	13	1.5	-	Sormás

**Földrengés paraméterek****Hypocenter Parameters**

MÁJUS / MAY, 2008

02	23:21:09.5	47.772N	16.079E	12	2.4	-	Austria
08	18:12:34.1	45.545N	18.226E	9	3.9	-	Croatia
15	8:05:13.6	47.352N	18.306E	10	1.4	-	Csákerény
22	7:41:28.5	48.368N	19.831E	0	1.7	-	Slovakia
27	9:45:06.9	48.032N	19.542E	0	0.8	-	Rimóc (expl.)
27	11:26:28.8	48.877N	20.454E	0	2.2	-	Slovakia (expl.)
27	19:13:30.7	45.770N	20.586E	10	2.5	-	Serbia

JÚNIUS / JUNE, 2008

01	1:09:13.6	48.230N	22.477E	3	1.6	-	Gelénes
06	11:07:16.3	47.981N	19.470E	0	1.9	-	Herencsény (expl.)
12	17:04:05.3	47.396N	18.532E	10	1.8	-	Csákvár
12	21:12:44.7	45.530N	16.170E	9	2.2	-	Croatia
17	10:44:37.9	48.049N	20.290E	0	0.9	-	Mikófalva (expl.)
17	10:57:30.4	47.896N	19.386E	0	1.6	-	Becske (expl.)
19	21:28:39.8	46.172N	16.428E	6	2.1	-	Croatia
20	10:09:27.3	46.994N	18.471E	3	1.3	-	Soponya
23	10:59:06.6	47.899N	19.391E	0	1.8	-	Becske (expl.)
24	10:58:31.5	48.364N	19.842E	0	2.0	-	Slovakia (expl.)
25	1:22:55.9	47.557N	21.939E	11	2.5	4-5	Vámospércs

JÚLIUS / JULY, 2008

01	11:15:59.6	47.862N	19.839E	6	1.6	-	Gyöngyösoroszi
02	9:16:06.4	46.946N	18.440E	0	1.1	-	Kisláng (expl.)
02	9:59:22.9	47.478N	18.658E	0	1.0	-	Bicske (expl.)
02	11:17:43.7	47.074N	17.930E	0	0.9	-	Veszprém (expl.)
02	15:54:21.5	46.468N	16.174E	6	3.6	-	Slovenia
09	10:39:00.0	48.901N	20.456E	0	2.1	-	Slovakia (expl.)
11	20:25:39.5	46.053N	21.051E	10	3.6	-	Romania
15	19:59:06.0	47.516N	21.880E	7	1.9	4-5	Vámospércs
30	10:09:32.8	46.981N	22.212E	6	2.2	-	Romania
31	9:29:20.9	47.896N	19.400E	0	1.8	-	Bercel (expl.)
31	9:39:50.9	48.360N	19.860E	0	2.0	-	Slovakia (expl.)
31	19:48:03.5	48.075N	20.237E	7	1.1	-	Szentdomonkos

AUGUSZTUS / AUGUST, 2008

01	7:29:59.3	48.269N	19.835E	0	1.2	-	Slovakia (expl.)
01	8:06:04.3	48.617N	20.716E	0	1.7	-	Slovakia (expl.)
01	9:51:38.0	47.005N	22.181E	1	2.1	-	Romania
02	7:27:43.1	45.908N	18.645E	1	1.5	-	Udvar
06	15:50:02.8	46.051N	18.429E	13	1.6	-	Kátoly
12	8:49:31.2	47.875N	20.582E	0	1.7	-	Tard (expl.)
12	11:03:49.3	48.006N	19.504E	1	1.6	-	Nógrádsipek
14	10:18:05.0	47.961N	19.222E	0	1.8	-	Szátok (expl.)
14	11:15:36.9	48.837N	20.576E	0	1.8	-	Slovakia (expl.)

**Hypocenter Parameters****Földrengés paraméterek**

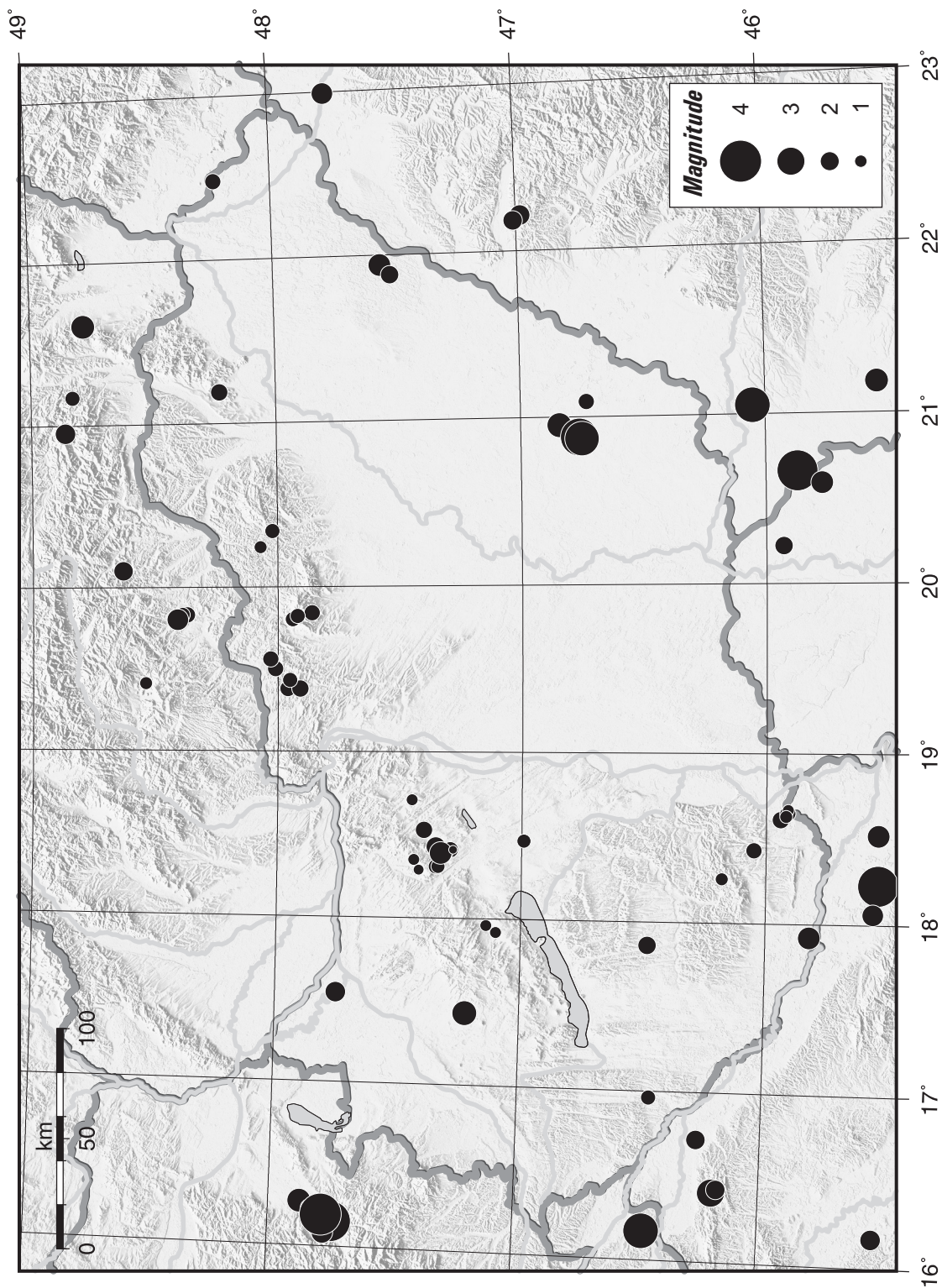
17	5:00:51.0	45.542N	21.182E	10	2.6	-	Romania
25	7:43:44.5	48.368N	19.840E	0	2.2	-	Slovakia (expl.)
25	11:28:08.6	47.958N	19.379E	10	1.6	-	Cserháthaláp
25	18:09:05.2	45.930N	18.621E	0	1.2	-	Sátorhely
SZEPTEMBER / SEPTEMBER, 2008							
03	10:40:51.7	48.585N	20.799E	0	1.7	-	Slovakia (expl.)
05	9:44:05.0	45.565N	18.057E	0	2.3	-	Croatia
08	8:43:25.7	48.386N	19.832E	5	1.5	-	Slovakia
08	10:41:19.2	47.909N	19.376E	0	1.8	-	Becske
11	12:46:35.8	48.034N	19.556E	0	1.7	-	Nagylóc
16	7:10:29.0	47.952N	19.819E	0	1.6	-	Mátraverebély (expl.)
18	10:38:29.0	47.954N	19.426E	0	1.5	-	Terény
20	15:21:54.6	45.941N	18.614E	0	1.8	-	Nagynyárád
22	7:53:54.8	48.542N	19.405E	0	1.0	-	Slovakia
22	8:30:10.4	47.923N	19.819E	0	1.5	-	Mátraszentimre
OKTÓBER / OCTOBER, 2008							
09	11:54:43.6	48.230N	21.188E	12	1.8	-	Gölp
14	5:21:22.0	47.869N	16.270E	3	2.6	-	Austria
14	7:08:53.9	47.834N	16.235E	2	1.7	-	Austria
14	19:59:53.7	48.312N	22.277E	0	1.5	-	Lónya (expl.)
14	21:00:01.9	47.275N	20.788E	0	1.5	-	Kisújszállás (expl.)
14	21:31:27.4	48.543N	22.683E	0	1.8	-	Ukraine (expl.)
15	21:00:23.6	47.755N	21.449E	0	2.0	-	Hajdúvid (expl.)
16	8:51:13.3	48.101N	20.216E	0	1.0	-	Bekőlce (expl.)
16	20:33:11.1	48.221N	22.000E	0	1.8	-	Rétközberencs (expl.)
18	17:01:30.2	45.919N	18.652E	1	1.1	-	Sátorhely
18	20:35:13.5	45.928N	20.217E	6	2.0	-	Serbia
24	8:30:09.6	46.180N	18.261E	0	1.1	-	Mánfa
NOVEMBER / NOVEMBER, 2008							
03	9:31:19.7	48.365N	19.832E	0	1.4	-	Slovakia (expl.)
03	9:37:47.0	47.774N	22.993E	5	2.3	-	Romania
05	8:53:04.8	48.580N	19.694E	0	1.7	-	Slovakia (expl.)
09	12:48:06.8	45.910N	18.671E	1	0.9	-	Udvar
11	5:56:21.6	46.840N	20.951E	10	2.7	-	Csárdaszállás
13	7:47:30.1	46.757N	20.881E	16	3.7	4-5	Kondoros
13	8:04:48.9	46.733N	21.086E	10	1.6	-	Mezőmegyer
13	12:50:22.7	46.754N	20.869E	17	3.5	4-5	Kondoros
19	10:31:45.6	48.827N	21.175E	0	1.4	-	Slovakia
20	9:56:40.2	48.405N	19.803E	1	2.4	-	Slovakia
21	15:52:04.5	45.916N	18.630E	1	1.2	-	Majs
25	14:33:48.2	48.776N	21.608E	0	2.6	-	Slovakia



**Földrengés paraméterek****Hypocenter Parameters**

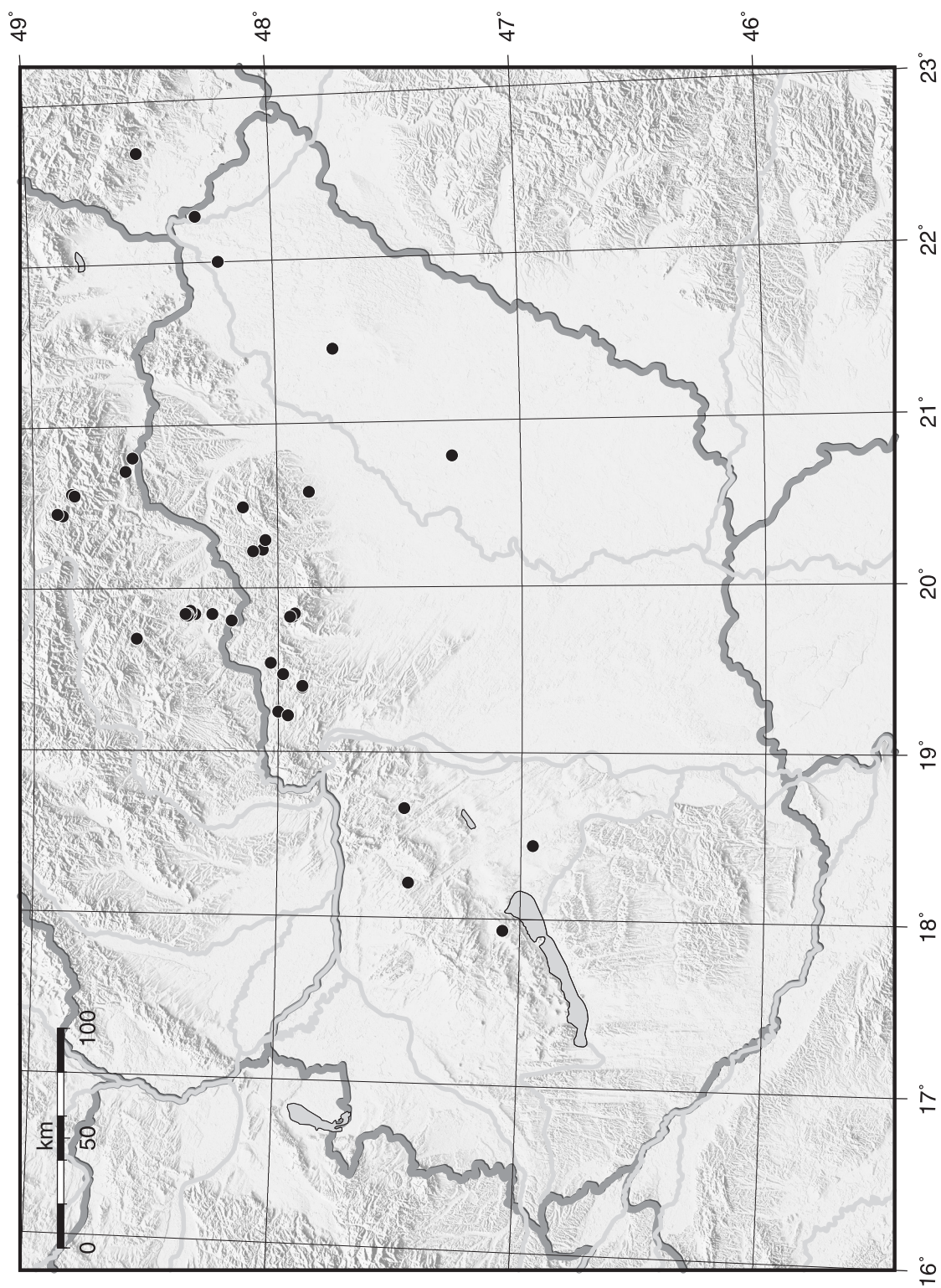
DECEMBER / DECEMBER, 2008

01	10:01:44.5	48.382N	19.841E	0	1.5	-	Slovakia (expl.)
02	13:33:41.2	47.755N	17.543E	13	2.2	-	Győrladamér
03	10:36:02.1	48.833N	20.567E	0	2.0	-	Slovakia (expl.)
07	2:47:41.3	47.778N	16.186E	7	4.0	-	Austria
15	10:23:45.8	47.343N	18.308E	5	1.3	-	Csákberény
15	17:44:09.4	45.820N	17.918E	6	2.5	-	Kemse
18	2:49:32.0	47.285N	18.415E	8	1.7	-	Zámoly
18	9:48:50.7	47.314N	18.391E	9	1.4	-	Zámoly
18	10:35:05.3	47.320N	18.374E	10	1.0	-	Zámoly
19	3:40:51.2	47.330N	18.393E	8	2.5	-	Zámoly
19	18:07:20.5	47.419N	18.290E	20	0.6	-	Pusztavám
20	16:38:26.9	48.021N	20.344E	9	1.4	-	Mónosbél
22	23:05:17.7	47.285N	18.409E	10	0.1	-	Zámoly



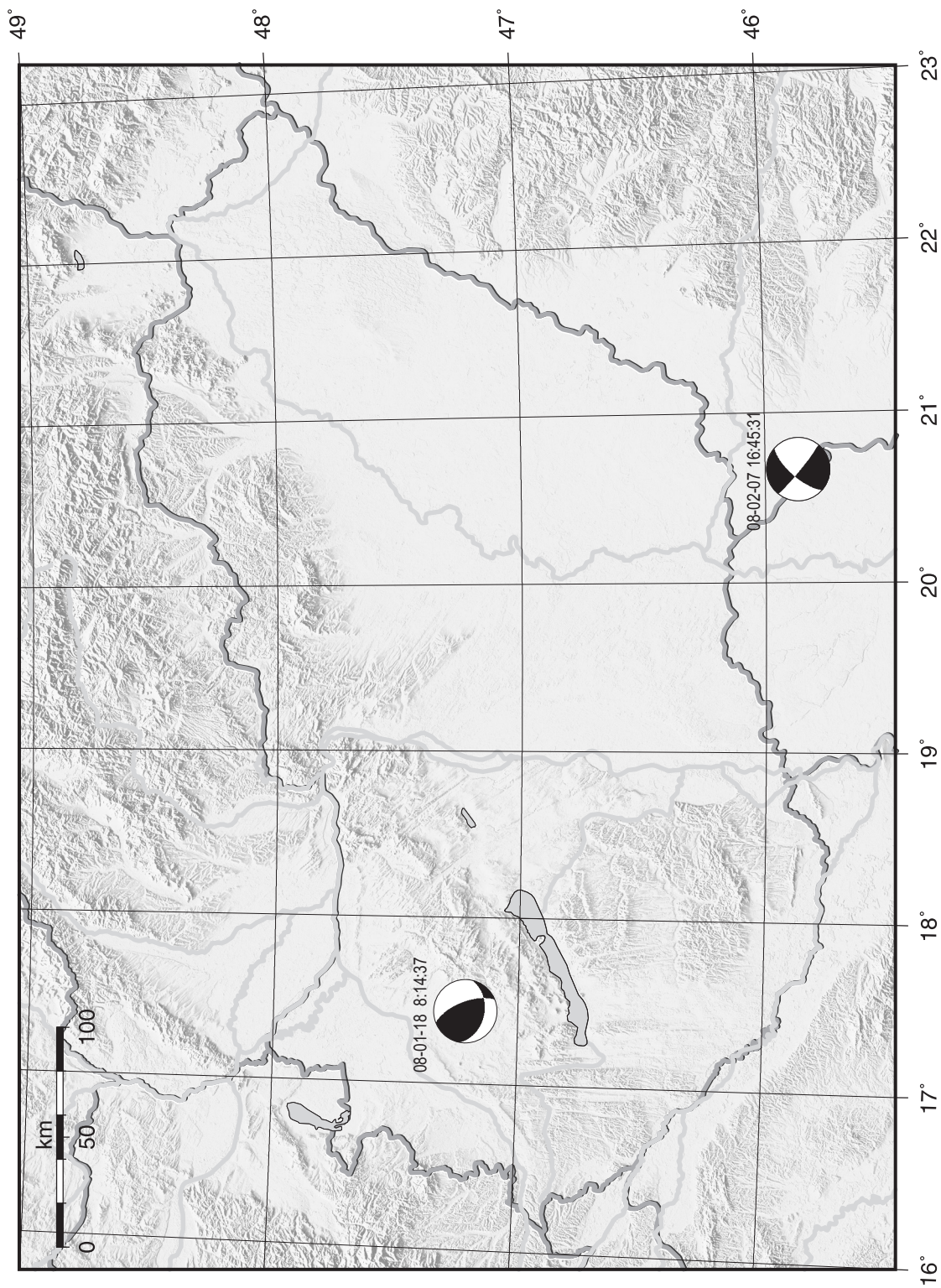
3.1. ábra A 2008-ban regisztrált földrengések epicentrumai

Figure 3.1. Epicenters of 2008 earthquakes



3.2. ábra A 2008-ban regisztrált robbantások epicentrumai

Figure 3.2. Epicenters of 2008 explosions



3.3. ábra A 2008-ban regisztrált földrengések fészekmechanizmusai

Figure 3.3. Fault plane solutions of 2008 earthquakes

## FÉSZEKPARAMÉTEREK ÉS FÁZISADATOK

A listában alkalmazott jelek és rövidítések magyarázata:

time:	Az esemény kipattanásának ideje (óra:perc:másodperc; UTC).
ML:	A rengés Richter-féle lokális magnitúdója.
lat:	Az esemény földrajzi szélessége (fok).
lon:	Az esemény földrajzi hosszúsága (fok).
h:	A fészek mélysége (km).
erh:	Horizontális hiba km-ben. ( $erh = \sqrt{SDX^2 + SDY^2}$ , ahol $SDX$ és $SDY$ az epicentrum földrajzi szélességének és hosszúságának meghatározási hibái.) Ha $erh = ---$ , a kevés rendelkezésre álló adat miatt $erh$ nem volt meghatározható.
erz:	A fészekmélység meghatározásának hibája (km). $erz = ---$ azt jelzi, hogy $erz$ nem volt meghatározható a kevés rendelkezésre álló adat miatt.
nr:	A számításnál felhasznált fázisadatok száma. Azonos állomásról származó P és S beérkezések 2 adatnak számítanak.
gap:	Az állomások közötti legnagyobb irányeltérés (fok).
rms:	A számított beérkezési idők átlagnégyzetes hibája (mp). ( $rms = \sqrt{\sum R_i^2 / nr}$ , ahol $R_i$ az $i$ -edik állomás időhibája (reziduál).)
Locality:	A rengés földrajzi helyének megnevezése, általában a legközelebbi település neve.
Comments:	Az eseménnyel kapcsolatos egyéb közlemény (pl. epicentrális intenzitás).
sta:	Az állomás neve. (L. 2. fejezet.)
dist:	Az állomás távolsága az epicentrumtól (km).
azm:	Az állomás irányszöge az epicentrumtól az északi iránytól számítva (fok).
phase:	Fázis azonosító; az első betű a kezdetet jellemzi: $e$ = lassan emelkedő $i$ = hirtelen kitérő; a második és harmadik betű a fázis megnevezése pl. Pn, Pg, Sn, Sg; a negyedik a kitérési irányt jelzi: C=kompreszió/fel, D=dilatáció/le.
hr mn sec:	A fázis beérkezési ideje (óra, perc, másodperc).
res:	Reziduál (másodperc). ( $res = T_{obs} - T_{cal}$ , ahol $T_{obs}$ a mért, és $T_{cal}$ a számított menetidő.)

Minden rengésnél, ahol elegendő számú első kitérési adat állt rendelkezésre, megkíséreltük a fészekmechanizmus meghatározását. Az ábrákon az alsó félteke sztereografikus képe látható, **P** a maximális, **T** a minimális feszültségtengely iránya. A fészekmechanizmusokat a 3.3. ábra foglalja össze.

## PHASE DATA

## Key to phase data encoding

time:	Time of occurrence of event in hours, mins and secs (UTC).
ML:	Richter local magnitude of the earthquake.
lat:	Latitude of the event in degrees.
lon:	Longitude of the event in degrees.
h:	Depth of the hypocenter in km.
erh:	Standard error of the epicenter in km. ( $erh = \sqrt{SDX^2 + SDY^2}$ , where $SDX$ and $SDY$ are the standard errors in latitude and longitude respectively, of the epicenter.) If $erh = ---$ , this means that $erh$ could not be computed because of insufficient data.
erz:	Standard error of the focal depth in km. If $erz = ---$ , this means that $erz$ could not be computed either because focal depth is fixed in the solution or because of insufficient data.
nr:	Number of station readings used in locating the earthquake. P and S arrivals for the same stations are regarded as 2 readings.
gap:	Largest azimuthal separation in degrees between stations.
rms:	Root mean square error of time residuals in seconds. ( $rms = \sqrt{\sum R_i^2 / nr}$ , where $R_i$ is the time residual of the $i^{th}$ station.
Locality:	A geographical indication of the epicenter area, usually the nearest settlement.
Comments:	Additional comments about the event, eg. maximum EMS intensity
sta:	Station name. (For details see Chapter 2.)
dist:	Distance from earthquake epicenter to station in km.
azm:	Azimuthal angle between epicenter to station measured from North in degrees.
phase:	Phase identifier; the first letter characterizes onset $e$ = emergent $i$ = impulsive, the second and third indicate the phase eg. Pn, Pg, Sn and Sg, the fourth indicates the polarity C=compression/up D=dilatation/down.
hr mn sec:	Arrival time of the phase from input data.
res:	Residual of the phase in secs. ( $res = T_{obs} - T_{cal}$ , where $T_{obs}$ is the observed and $T_{cal}$ is the calculated travel time respectively.

Fault plane solutions were attempted for each event where any information for the stress field could be drawn. Stereographic projections of the lower focal hemisphere are shown, **P** and **T** are the main compression and tension axes respectively. Strike, dip and slip values of the nodal planes are also indicated. Calculations were carried out by computer program FPFIT (Reasenber and Oppenheimer, 1985). The results are summarized in Fig. 3.3.

## Földrengés paraméterek

## Hypocenter Parameters

1.

2008-01-07 time: 7:28:03.19 UTC ML= 3.0  
 lat: 46.188N lon: 16.415E h= 11.0 km  
 erh= 2.0km erz= 1.0km  
 nr= 20 gap=198 rms=0.45  
 Locality: Croatia  
 Comments:

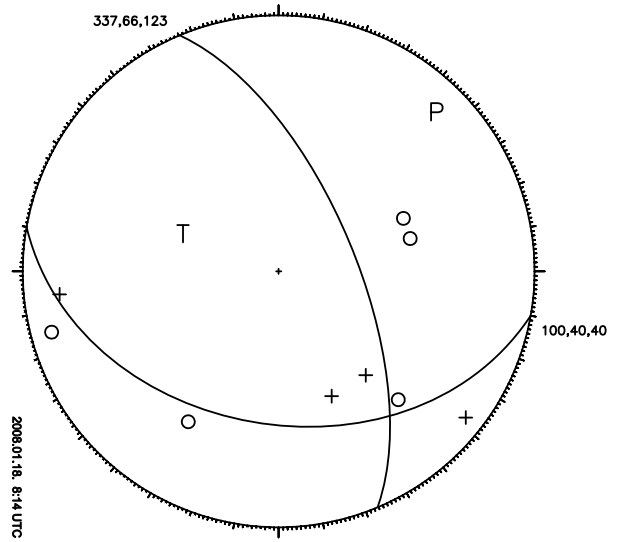
sta	dist	azm	phase	hr mn sec	res
KOGS	31.5	336	iPgD	7:28:09.50	0.35
			iSg	28:14.10	0.29
BEHE	41.9	42	ePgD	7:28:10.30	-0.62
			eSg	28:15.90	-1.05
GOLS	64.2	252	iPg	7:28:15.10	0.27
			eSg	28:25.20	1.30
GCIS	70.6	240	iPg	7:28:15.90	-0.06
			iSg	28:25.40	-0.52
DOBS	73.2	267	iPgc	7:28:16.30	-0.10
			eSg	28:26.70	-0.01
GROS	76.6	293	iPgc	7:28:16.80	-0.20
PDKS	110.2	264	iPn	7:28:22.50	-0.06
			iSn	28:37.60	-0.07
PERS	111.5	296	iPn	7:28:23.10	0.37
			iSn	28:37.20	-0.77
SOKA	119.4	297	Pn	7:28:24.00	0.29
			Sn	28:38.40	-1.31
ARSA	136.3	330	Pn	7:28:26.60	0.78
			Sn	28:43.50	0.03
OBKA	148.0	284	Sn	7:28:46.90	0.84

2.

2008-01-18 time: 8:14:37.77 UTC ML= 2.7  
 lat: 47.216N lon: 17.434E h= 11.9 km  
 erh= 2.2km erz= 2.3km  
 nr= 34 gap= 54 rms=1.02  
 Locality: Pápasalamon  
 Comments: felt 4 EMS

sta	dist	azm	phase	hr mn sec	res
PKST	45.7	84	ePgC	8:14:46.40	0.19
			eSg	14:53.20	0.40
PKSG	75.0	75	ePgD	8:14:49.50	-1.83
			eSg	15:01.40	-0.51
SOP	84.0	308	ePgC	8:14:53.70	0.77
			eSg	15:04.70	-0.05
PKS9	95.0	137	eP*D	8:14:55.60	0.73
			S*	15:07.90	-0.30
BEHE	96.9	211	eP*D	8:14:54.50	-0.65
			eS*	15:10.80	2.10
BUD	123.8	76	ePnD	8:14:56.90	-1.83
			eSn	15:16.50	1.43
KOGS	124.2	227	ePn	8:14:59.20	0.42
			eSn	15:15.90	0.74
MODS	129.3	355	ePn	8:14:59.90	0.49
			eSn	15:15.00	-1.29
SMOL	144.3	360	ePn	8:15:02.10	0.81
			eSn	15:20.90	1.27
ARSA	144.7	272	Pn	8:15:01.40	0.06
			Sn	15:18.40	-1.31
PKSM	144.8	140	ePnC	8:15:01.30	-0.05
			eSn	15:20.30	0.56
RHK3	160.3	157	ePnC	8:15:03.50	0.22
			eSn	15:26.10	2.92
KOLL	168.0	26	ePn	8:15:04.70	0.47
			eSn	15:24.00	-0.87
SOKA	192.3	252	Pn	8:15:08.80	1.53
			Sn	15:28.70	-1.58
PSZ	201.0	67	ePnD	8:15:09.90	1.55
OBKA	233.6	250	Pn	8:15:11.50	-0.91
			Sn	15:36.80	-2.63
MOA	248.7	286	Pn	8:15:14.20	-0.10
			Sn	15:41.80	-0.99
KECS	268.4	58	ePn	8:15:17.60	0.84
VOY	301.4	244	ePn	8:15:28.80	7.93
KHC	357.2	307	ePn	8:15:29.80	1.97

STHS 373.9 49 e n 8:15:33.00 3.10



3.

2008-01-30 time: 14:54:21.89 UTC ML= 3.9  
 lat: 47.745N lon: 16.154E h= 4.1 km  
 erh= 1.2km erz= 1.3km  
 nr= 36 gap= 28 rms=0.47  
 Locality: Austria  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CONA	29.9	313	Pg	14:54:27.30	0.02
			Sg	54:30.60	-0.88
CSNA	30.1	313	Pg	14:54:27.30	-0.01
			Sg	54:30.00	-1.53
SOP	31.1	103	ePg	14:54:28.50	1.01
			eSg	54:32.80	0.94
ARSA	72.6	221	Pg	14:54:34.20	-0.68
			Sg	54:43.00	-2.01
ZST	86.8	55	ePg	14:54:37.30	-0.11
			eSg	54:48.90	-0.62
SMOL	127.8	48	ePn	14:54:44.30	-0.03
			eSn	55:01.20	-0.64
MOA	141.9	275	Pn	14:54:45.40	-0.70
			Sn	55:03.60	-1.38
KOGS	144.3	177	iPn	14:54:46.60	0.20
SOKA	145.9	216	Pn	14:54:45.90	-0.69
			Sn	55:06.80	0.94
BEHE	149.3	162	ePnC	14:54:47.70	0.68
			eSn	55:08.90	2.27
PKST	151.6	111	ePnD	14:54:47.10	-0.21
			eSn	55:05.10	-2.04
PKSG	172.8	103	ePnD	14:54:49.70	-0.25
			eSn	55:10.00	-1.84
VRAC	176.9	11	iPnD	14:54:50.10	-0.36
TREC	179.3	344	ePn	14:54:51.10	0.34
			eSn	55:11.60	-1.67
OBKA	183.6	222	Pn	14:54:51.60	0.31
			Sn	55:13.80	-0.43
PDKS	205.0	205	iPn	14:54:54.40	0.43
PKS9	206.2	129	eSn	14:55:11.00	-8.25
VYHS	216.4	67	ePn	14:54:54.50	-0.89
			eSn	55:19.30	-2.21
BUD	217.7	98	ePnC	14:54:51.20	-4.35
			eSn	55:29.30	7.49
GEC2	219.3	304	ePn	14:54:56.10	0.35
			eSn	55:21.80	-0.35
KBA	224.6	251	Pn	14:54:57.10	0.69
			Sn	55:22.20	-1.13
MYKA	227.2	237	Pn	14:54:57.00	0.27
			Sn	55:22.60	-1.31
GORS	228.0	226	iPn	14:54:57.10	0.27

## Hypocenter Parameters

PENC	234.5	89	ePnD	14:54:57.60	-0.05
			eSn	55:24.50	-1.04
BGLD	236.0	268	iPnD	14:54:58.20	0.37
KHC	245.1	309	ePn	14:54:59.50	0.53
			eSn	55:28.40	0.51
MORC	248.0	24	iPnD	14:54:59.30	-0.02
PKSM	254.7	132	ePnC	14:54:59.70	-0.46
			eSn	55:26.20	-3.81
VOY	256.8	222	ePn	14:55:00.70	0.28
			eSn	55:36.90	6.42
RHK3	261.2	142	ePnD	14:55:00.90	-0.07
			eSn	55:30.20	-1.25
PKS2	270.7	121	eSn	14:55:31.30	-2.27
OKC	275.0	32	ePn	14:55:02.80	0.11
PRU	276.1	335	ePn	14:55:03.20	0.37
			eSn	55:38.50	3.73
PSZ	280.7	86	iPnD	14:55:02.70	-0.71
PSZ	280.7	86	ePnD	14:55:03.30	-0.11
			eSn	55:33.50	-2.29
FVI	285.8	243	Pn	14:55:05.10	1.06
WET	288.0	303	ePn	14:55:06.70	2.39
			eSn	55:42.30	4.90
DPC	290.0	2	ePn	14:55:04.00	-0.57
			eSn	55:42.40	4.55
SKDS	294.2	214	iPn	14:55:05.30	0.21
UPC	307.4	358	ePn	14:55:06.50	-0.23
SEST	318.0	250	Pn	14:55:10.00	1.95
PVCC	330.5	340	ePn	14:55:10.40	0.79
			eSn	55:54.00	7.17
SCE	344.5	257	ePn	14:55:12.70	1.34
KSP	344.7	2	ePn	14:55:11.90	0.51

4.

2008-02-01 time: 14:45:22.33 UTC ML= 0.8  
 lat: 47.104N lon: 17.924E h= 9.4 km  
 erh= 6.0km erz= 6.3km  
 nr= 6 gap=235 rms=0.12  
 Locality: Kádárta  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKST	19.2	26	ePgC	14:45:26.10			-0.05
			eSg	45:28.90			-0.23
PKSG	47.7	48	ePgC	14:45:31.20			0.18
			eSg	45:37.80			0.01
PKSM	113.3	151	ePn	14:45:42.30			0.00
			eSn	45:57.80			-0.07

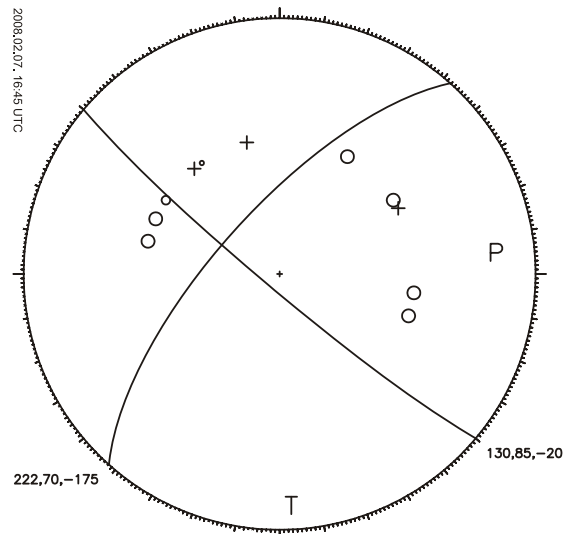
5.

2008-02-07 time: 16:45:31.39 UTC ML= 3.9  
 lat: 45.867N lon: 20.663E h= 18.5 km  
 erh= 3.0km erz= 2.3km  
 nr= 39 gap=171 rms=0.90  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
TIM	45.7	108	Pg	16:45:39.41			-0.79
BZS	79.3	110	P*	16:45:44.44			-1.02
PKSM	161.1	284	ePnD	16:45:56.60			0.46
GZR	173.1	108	PnD	16:45:58.00			0.37
			Sn	46:18.69			0.59
DRGR	188.3	57	PnD	16:45:59.79			0.25
			Sn	46:21.37			-0.12
PKS9	200.6	294	PnD	16:46:01.30			0.24
			eSn	46:23.20			-1.01
BUD	219.2	325	ePnD	16:45:56.80			-6.58
			eSn	46:27.80			-0.54
PSZ	235.5	346	ePnC	16:46:05.80			0.38
TRPA	289.3	30	ePnD	16:46:11.90			-0.23
VYHS	323.3	335	ePn	16:46:17.20			0.84
			eSn	46:49.30			-2.14
CRVS	342.9	10	ePn	16:46:19.60			0.80
VOIR	345.3	98	PnD	16:46:19.72			0.61
KOLS	362.0	20	ePn	16:46:22.10			0.91
SOP	372.9	303	ePnD	16:46:25.00			2.45
			eSn	46:58.60			-3.86

## Földregés paraméterek

ZST	374.6	314	ePn	16:46:24.50	1.74
			eSn	47:01.50	-1.33
MODS	379.1	317	ePn	16:46:24.60	1.28
			eSn	47:01.60	-2.23
SMOL	383.0	320	eSn	16:47:03.00	-1.70
STHS	397.1	6	ePn	16:46:28.10	2.53
BURA	398.7	61	PnC	16:46:25.70	-0.06
ARSA	423.1	291	Pn	16:46:29.60	0.79
			Sn	47:12.20	-1.39
CONA	431.7	302	Pn	16:46:29.70	-0.18
			Sn	47:13.80	-1.70
CSNA	431.9	302	Pn	16:46:29.80	-0.11
			Sn	47:13.50	-2.05
SOKA	443.3	282	Pn	16:46:31.50	0.18
			Sn	47:16.80	-1.27
OJC	488.3	352	ePn	16:46:38.70	1.76
VRAC	490.0	321	PnC	16:46:38.05	0.90
			Sn	47:28.29	-0.16
MORC	493.6	332	ePn	16:46:34.38	-3.22
			eSn	47:25.13	-4.11
MOA	535.3	294	Pn	16:46:42.50	-0.30
			Sn	47:36.50	-2.00
DPC	594.2	327	ePn	16:46:51.20	1.06
			eSn	47:48.20	-3.37
TIRR	629.2	104	Pn	16:46:56.50	2.00
KHC	645.5	304	ePn	16:46:55.80	-0.74
			eSn	48:00.00	-2.96



6.

2008-02-08 time: 8:07:08.14 UTC ML= 1.2  
 lat: 47.461N lon: 18.210E h= 0.0 km  
 erh= 2.6km erz= 228km  
 nr= 6 gap=269 rms=0.13  
 Locality: Bokod  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PKSG	15.7	119	ePgC	8:07:10.90			-0.03
			eSg	07:13.40			0.29
PKST	26.1	211	ePgD	8:07:12.90			0.10
			eSg	07:16.40			-0.03
PKS9	97.3	177	ePgD	8:07:25.40			-0.12
			eSg	07:37.80			-1.27

7.

2008-02-09 time: 15:00:01.86 UTC ML= 2.1  
 lat: 48.627N lon: 20.102E h= 10.0 km  
 erh= 7.8km erz=12.6km  
 nr= 10 gap=143 rms=0.93  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
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## Földrengés paraméterek

PSZ	80.3	191	ePgD	15:00:17.10	0.78
			eSg	00:25.90	-1.69
VYHS	94.6	261	ePg	15:00:19.50	0.65
			eSg	00:31.30	-0.80
CRVS	104.5	73	eP*	15:00:20.00	-0.57
			eS*	00:32.60	-2.56
STHS	121.2	44	ePn	15:00:23.10	0.38
			eSn	00:39.10	0.10
KOLS	163.2	78	ePn	15:00:29.00	1.04
			eSn	00:48.10	-0.22

8.

2008-02-14 time: 9:34:04.73 UTC ML= 0.9  
 lat: 47.452N lon: 18.713E h= 10.0 km  
 erh= 8.8km erz= 7.1km  
 nr= 8 gap=178 rms=0.64  
 Locality: Etyek  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	25.2	255	ePgC	9:34:09.30	-0.27
			eSg	34:13.40	0.05
PKST	55.6	247	ePgC	9:34:14.80	-0.01
			eSg	34:23.20	0.53
VYHS	116.2	5	ePn	9:34:26.20	1.23
			eSn	34:39.50	-1.27
PKSM	138.0	182	ePn	9:34:26.90	-0.79
			eSn	34:46.70	1.10

9.

2008-02-15 time: 10:07:55.32 UTC ML= 1.6  
 lat: 48.379N lon: 19.827E h= 0.0 km  
 erh= 1.9km erz= 476km  
 nr= 6 gap=157 rms=0.28  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	50.1	77	ePg	10:08:04.30	0.04
			eSg	08:10.90	-0.34
PSZ	51.5	174	ePgD	10:08:04.60	0.09
			eSg	08:11.30	-0.38
VYHS	74.5	280	ePg	10:08:09.00	0.38
			eSg	08:18.40	-0.59

10.

2008-02-19 time: 9:23:40.69 UTC ML= 1.9  
 lat: 47.937N lon: 19.819E h= 0.0 km  
 erh= 4.1km erz= 4.8km  
 nr= 7 gap=200 rms=0.72  
 Locality: Mátraverebély  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PSZ	6.0	110	ePgC	9:23:41.20	-0.55
			eSg	23:43.50	0.91
KECS	78.4	39	ePg	9:23:54.80	0.12
			eSg	24:04.40	-1.19
VYHS	95.8	310	ePg	9:23:58.20	0.41
			eSg	24:10.40	-0.73
CRVS	162.1	49	eSn	9:24:30.40	1.21

11.

2008-03-14 time: 10:12:18.54 UTC ML= 2.3  
 lat: 48.339N lon: 19.840E h= 0.0 km  
 erh= 3.0km erz= 4.1km  
 nr= 13 gap=117 rms=0.87  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PSZ	47.0	175	ePg	10:12:26.90	-0.02
			eSg	12:33.70	0.24
KECS	50.4	71	ePg	10:12:27.00	-0.54

## Hypocenter Parameters

			eSg	12:33.50	-1.05
VYHS	76.3	283	ePg	10:12:31.90	-0.27
			eSg	12:41.40	-1.40
KOLL	109.7	284	ePg	10:12:38.90	0.78
			eSg	12:53.30	-0.10
CRVS	134.9	62	ePn	10:12:42.20	-0.20
			eSn	12:58.80	-2.20
STHS	158.0	41	ePn	10:12:46.50	1.23
			eSn	13:07.00	0.88
KOLS	191.1	70	eSn	10:13:15.30	1.83

12.

2008-03-19 time: 7:05:48.23 UTC ML= 2.0  
 lat: 46.481N lon: 17.856E h= 10.0 km  
 erh= 2.4km erz= 2.8km  
 nr= 13 gap=114 rms=0.71  
 Locality: Somodor  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKS9	34.5	70	ePg	7:05:54.40	-0.25
			Sg	06:00.40	0.75
PKSM	67.4	116	ePgC	7:06:00.60	0.19
			eSg	06:09.90	0.00
RHK3	72.6	155	ePgD	7:06:00.10	-1.22
			eSg	06:11.30	-0.23
BEHE	83.0	269	ePgD	7:06:03.80	0.63
			eSg	06:15.60	0.79
PKST	87.5	9	ePgC	7:06:03.90	-0.07
			eSg	06:15.30	-0.94
PKSG	109.1	22	ePnC	7:06:07.50	-0.10
			eSn	06:21.10	-1.60
PKS6	131.7	84	eSn	7:06:29.00	1.29

13.

2008-03-28 time: 11:45:38.53 UTC ML= 1.5  
 lat: 48.194N lon: 19.799E h= 0.0 km  
 erh= \*\*\*km erz= \*\*\*km  
 nr= 8 gap=126 rms=0.72  
 Locality: Somoskő  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PSZ	31.5	167	ePgC	11:45:44.40	0.25
			eSg	45:47.90	-0.63
KECS	60.2	58	ePg	11:45:49.20	-0.08
			eSg	45:56.90	-0.76
VYHS	78.8	295	ePg	11:45:53.70	1.11
			eSg	46:02.30	-1.27
KOLL	111.9	292	ePg	11:45:59.00	0.48
			eSg	46:13.20	-0.91

14.

2008-03-28 time: 12:16:11.97 UTC ML= 1.9  
 lat: 48.000N lon: 19.241E h= 0.0 km  
 erh= ---km erz= ---km  
 nr= 4 gap=265 rms=0.55  
 Locality: Csesztve  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PENC	23.5	173	eSg	12:16:20.40	0.32
PSZ	49.6	101	ePgC	12:16:21.60	0.59
			eSg	16:27.20	-0.86
BUD	59.7	196	eSg	12:16:30.70	-0.50

15.

2008-03-31 time: 10:02:43.95 UTC ML= 2.1  
 lat: 48.359N lon: 19.854E h= 0.0 km  
 erh= 2.7km erz= 4.5km  
 nr= 12 gap=118 rms=0.78  
 Locality: Slovakia  
 Comments: probably explosion

## Hypocenter Parameters

## Földrengés paraméterek

sta	dist	azm	phase	hr mn sec	res
KECS	48.8	74	ePg	10:02:52.50	-0.16
			eSg	02:58.90	-0.56
PSZ	49.1	176	ePgC	10:02:52.70	-0.01
			eSg	02:59.90	0.35
PENC	76.2	214	eSg	10:03:08.20	0.02
VYHS	76.8	281	ePg	10:02:58.10	0.43
			eSg	03:06.60	-1.77
KOLL	110.1	283	ePg	10:03:04.20	0.59
			eSg	03:18.40	-0.55
CRVS	133.0	63	eSn	10:03:24.40	-1.60
STHS	155.7	41	ePn	10:03:11.60	1.20
			eSn	03:32.60	1.58

16.

2008-04-01 time: 10:09:41.61 UTC ML= 1.5  
 lat: 47.940N lon: 19.797E h= 19.6 km  
 erh= 8.1km erz= 0.9km  
 nr= 5 gap=221 rms=0.16  
 Locality: Mátraverebély  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PSZ	7.7	108	ePgC	10:09:45.50	0.14
			eSg	09:48.00	-0.29
PENC	42.0	247	ePgC	10:09:49.90	0.02
			eSg	09:56.50	0.17
PKSG	121.9	240	eSn	10:10:16.60	-0.13
PKST	152.6	240	eSn	10:10:15.00	-8.55

17.

2008-04-02 time: 13:38:47.61 UTC ML= 0.8  
 lat: 47.142N lon: 17.959E h= 10.0 km  
 erh=55.7km erz=50.3km  
 nr= 6 gap=231 rms=0.19  
 Locality: Gyulafirátót  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKST	14.2	24	ePgC	13:38:50.50	-0.21
			eSg	38:53.40	0.28
PKSG	42.9	50	ePgC	13:38:55.50	0.03
			eSg	39:01.50	-0.10
PKSM	115.9	153	ePnC	13:39:07.90	0.09
			eSn	39:21.70	-1.87

18.

2008-04-04 time: 16:34:13.94 UTC ML= 2.1  
 lat: 47.348N lon: 18.428E h= 10.0 km  
 erh= 4.6km erz= 3.4km  
 nr= 12 gap=113 rms=0.91  
 Locality: Gánt  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	5.6	330	ePgC	16:34:16.20	0.22
			eSg	34:17.20	-0.38
PKST	31.4	252	ePgD	16:34:20.00	0.18
			eSg	34:24.80	0.39
PENC	80.9	53	ePgD	16:34:26.90	-1.59
			eSg	34:40.10	0.26
PKS9	85.4	188	ePg	16:34:29.90	0.61
			Sg	34:41.90	0.63
PSZ	127.1	60	ePnD	16:34:36.80	1.25
			eSn	34:53.20	0.80
PKSM	127.4	173	ePnD	16:34:34.10	-1.48
			eSn	34:50.30	-2.16

19.

2008-04-04 time: 16:37:20.92 UTC ML= 0.8  
 lat: 47.437N lon: 18.354E h= 7.4 km  
 erh= 1.1km erz= 1.1km  
 nr= 5 gap=280 rms=0.07  
 Locality: Oroszlány  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	5.7	151	ePgC	16:37:22.70	0.11
			eSg	37:23.80	-0.10
PKST	31.2	231	ePgC	16:37:26.60	-0.04
			eSg	37:31.10	-0.01
PKS9	94.6	183	eSg	16:37:51.10	0.01

20.

2008-04-06 time: 22:16:03.14 UTC ML= 2.1  
 lat: 46.256N lon: 16.718E h= 13.6 km  
 erh= 2.1km erz= 1.2km  
 nr= 16 gap=161 rms=0.40  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
BEHE	24.3	11	ePgC	22:16:07.90	-0.20
			eSg	16:12.00	0.02
KOGS	41.9	301	iPg	22:16:10.90	-0.10
			iSg	16:17.10	-0.02
LEGS	113.5	253	iPn	22:16:22.40	-0.19
			iSn	16:37.90	0.14
PERS	130.1	289	ePn	22:16:24.50	-0.16
			iSn	16:40.60	-0.84
PDKS	134.3	262	iPn	22:16:25.70	0.52
			eSn	16:41.60	-0.77
SOKA	137.7	290	Pn	22:16:25.40	-0.20
			Sn	16:43.80	0.67
ARSA	143.4	320	Pn	22:16:26.80	0.48
			Sn	16:44.50	0.11
PKSM	148.5	92	ePn	22:16:28.00	1.05
			eSn	16:44.80	-0.72

21.

2008-04-18 time: 12:00:22.51 UTC ML= 2.2  
 lat: 48.856N lon: 20.947E h= 0.1 km  
 erh= 1.0km erz= 2.6km  
 nr= 11 gap=132 rms=0.37  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CRVS	38.1	82	ePg	12:00:29.50	0.19
			eSg	00:34.40	-0.21
KECS	53.6	219	ePg	12:00:32.00	-0.08
			eSg	00:39.20	-0.35
STHS	66.0	19	ePg	12:00:34.30	0.00
			eSg	00:43.30	-0.19
KOLS	97.6	85	ePg	12:00:39.90	-0.04
			eSg	00:53.10	-0.44
PSZ	130.2	217	ePgC	12:00:45.70	-0.06
			ePn	12:00:50.80	1.24
VYHS	160.6	255	eSn	01:08.20	-2.46

22.

2008-04-21 time: 8:31:49.30 UTC ML= 1.5  
 lat: 47.926N lon: 19.836E h= 0.0 km  
 erh= \*\*\*km erz= \*\*\*km  
 nr= 6 gap=209 rms=0.80  
 Locality: Mátraszentimre  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PSZ	4.4	102	ePgC	8:31:49.40	-0.69
			eSg	31:52.60	1.89
KECS	78.5	38	ePg	8:32:03.70	0.38

## Földrengés paraméterek

VYHS 97.5 310 eSg 32:13.90 -0.35  
 ePg 8:32:07.60 0.89  
 eSg 32:19.60 -0.70

23.

2008-04-21 time: 12:26:10.85 UTC ML= 1.7  
 lat: 48.063N lon: 20.226E h= 0.0 km  
 erh= 1.8km erz= 2.4km  
 nr= 8 gap=211 rms=0.45  
 Locality: Szentdomonkos  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PSZ	29.5	237	ePgC	12:26:16.00	-0.12
			eSg	26:20.70	0.46
KECS	50.5	22	ePg	12:26:19.10	-0.77
			eSg	26:26.90	-0.01
VYHS	113.8	295	ePg	12:26:31.20	0.03
			eSg	26:47.00	-0.02
STHS	168.1	26	ePn	12:26:39.60	0.76
			eSn	27:01.60	0.92

24.

2008-04-24 time: 10:27:28.66 UTC ML= 2.1  
 lat: 48.136N lon: 20.489E h= 0.0 km  
 erh= 2.9km erz= 4.5km  
 nr= 8 gap=185 rms=0.36  
 Locality: Mályinka  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	38.6	360	ePg	10:27:35.70	0.16
			eSg	27:40.50	-0.41
PSZ	50.6	241	ePg	10:27:37.60	-0.08
			eSg	27:46.20	1.47
VYHS	128.9	288	ePg	10:27:51.90	0.23
			eSg	28:08.90	-0.73
STHS	152.8	21	ePn	10:27:54.50	-0.24
KOLS	158.8	56	ePn	10:27:55.90	0.41

25.

2008-04-25 time: 14:53:18.02 UTC ML= 2.5  
 lat: 45.545N lon: 18.517E h= 0.1 km  
 erh= 5.8km erz= 3.2km  
 nr= 11 gap=273 rms=0.85  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	43.4	332	ePgC	14:53:26.00	0.22
			eSg	53:31.30	-0.53
PKSM	74.8	7	ePg	14:53:31.50	0.12
			eSg	53:42.70	0.91
PKS9	117.3	351	ePgD	14:53:37.10	-1.87
			eSg	53:55.30	-0.01
PKS2	118.3	27	eSg	14:53:55.40	-0.22
PKS6	142.5	35	eSn	14:54:02.60	0.44
BEHE	169.6	307	eSn	14:54:09.10	0.92
PKSG	205.6	357	ePn	14:53:51.30	0.62
			eSn	54:17.90	1.75

26.

2008-04-26 time: 19:19:11.92 UTC ML= 1.5  
 lat: 46.461N lon: 16.958E h= 13.4 km  
 erh= 2.1km erz= 0.8km  
 nr= 13 gap=164 rms=0.20  
 Locality: Sormás  
 Comments:

sta	dist	azm	phase	hr mn sec	res
BEHE	14.0	274	ePg	19:19:15.40	0.02
			eSg	19:18.40	0.32
KOGS	54.4	268	iPg	19:19:22.00	0.08
			eSg	19:29.40	-0.32

## Hypocenter Parameters

sta	dist	azm	phase	hr mn sec	res
PKS9	102.3	82	eS*	19:19:44.10	0.03
GROS	111.8	270	ePn	19:19:31.00	-0.19
GOLS	114.4	244	iPn	19:19:31.70	0.19
RHK3	118.5	122	ePn	19:19:32.10	0.07
			eSn	19:47.20	-0.50
DOBS	119.8	253	ePn	19:19:32.10	-0.08
PKSM	132.6	102	ePn	19:19:33.70	-0.08
			eSn	19:51.20	0.38
PERS	142.5	278	ePn	19:19:34.70	-0.32
PKSG	150.4	47	eSn	19:19:59.90	5.13

27.

2008-05-02 time: 23:21:09.49 UTC ML= 2.4  
 lat: 47.772N lon: 16.079E h= 12.1 km  
 erh= 1.9km erz= 1.5km  
 nr= 30 gap=102 rms=0.94  
 Locality: Austria  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CONA	23.8	317	Pg	23:21:14.30	0.05
			Sg	21:17.20	-0.77
SOP	37.3	105	ePgC	23:21:17.50	1.01
			eSg	21:22.60	0.65
ARSA	71.5	216	Pg	23:21:22.30	-0.13
			Sg	21:31.20	-1.33
ZST	89.8	58	ePg	23:21:25.20	-0.47
			eSg	21:37.00	-1.30
SMOL	130.0	51	eSn	23:21:47.70	-0.41
MOA	136.0	274	Pn	23:21:31.90	-0.04
			Sn	21:48.80	-0.65
SOKA	145.1	213	Pn	23:21:34.70	1.63
			Sn	21:50.30	-1.17
PKST	158.0	111	ePnC	23:21:35.10	0.43
			eSn	21:53.60	-0.72
TREC	174.9	346	ePn	23:21:37.00	0.21
			eSn	21:56.50	-1.58
PKSG	179.0	104	ePnD	23:21:37.70	0.41
			eSn	21:57.80	-1.18
OBKA	182.1	220	Pn	23:21:40.80	3.12
			Sn	22:00.00	0.32
KOLL	194.7	63	ePn	23:21:39.70	0.44
			eSn	22:00.70	-1.78
VYHS	220.4	69	ePn	23:21:42.30	-0.16
			eSn	22:06.40	-1.78
KHC	238.9	309	ePn	23:21:46.70	1.94
			eSn	22:12.60	0.33
PRU	271.1	335	ePn	23:21:50.30	1.53
			eSn	22:21.90	2.48
DPC	287.3	4	ePn	23:21:54.30	3.50
			eSn	22:28.10	5.08
UPC	304.3	359	ePn	23:21:56.30	3.38

28.

2008-05-08 time: 18:12:34.10 UTC ML= 3.9  
 lat: 45.545N lon: 18.226E h= 9.1 km  
 erh= 6.7km erz= 4.6km  
 nr= 18 gap=184 rms=0.77  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	38.3	3	ePg	18:12:42.30	1.18
			eSg	12:53.70	7.10
PKSM	80.9	24	ePgD	18:12:47.90	-0.73
PKS9	115.9	2	ePnC	18:12:53.90	-0.53
			eSn	13:14.30	4.01
PKS2	130.1	36	ePn	18:12:55.50	-0.70
			eSn	13:14.60	1.16
BEHE	152.3	312	ePnD	18:12:59.80	0.83
			eSn	13:26.80	8.43
PKS6	156.5	41	ePnC	18:13:00.70	1.22
			eSn	13:20.50	1.21
PKST	191.1	356	eSn	18:13:34.80	7.82
PKSN	196.6	40	ePnC	18:13:05.70	1.21
GCTS	205.5	280	iPn	18:13:05.40	-0.20
PKSG	205.7	4	ePnC	18:13:05.00	-0.63

## Hypocenter Parameters

			eSn	13:38.10	7.88
BUD	224.1	16	ePnD	18:13:12.80	4.88
			eSn	13:44.00	9.71
LEGS	230.7	281	iPn	18:13:08.20	-0.55
BOJS	232.4	269	ePn	18:13:08.70	-0.25
			eSn	13:42.40	6.26
TIM	234.5	85	iPnD	18:13:09.40	0.19
BZS	264.8	88	iPn	18:13:07.00	-5.99
VISS	265.4	276	iPn	18:13:13.00	-0.07
PERS	269.3	297	ePn	18:13:13.80	0.24
SOP	269.9	332	ePnC	18:13:14.70	1.07
			eSn	13:58.60	14.14
SOKA	277.2	297	Pn	18:13:14.50	-0.03
			Sn	13:49.80	3.73
ARSA	281.4	312	Pn	18:13:15.70	0.64
PSZ	293.1	26	ePnD	18:13:14.00	-2.52
			eSn	14:01.50	11.89
OBKA	304.2	291	Pn	18:13:18.10	0.19
CONA	320.7	326	Pn	18:13:21.00	1.03
VYHS	331.1	8	ePn	18:13:20.80	-0.47
			eSn	13:59.20	1.14
SMOL	335.6	350	ePn	18:13:22.80	0.98
KOLL	337.6	2	ePn	18:13:21.70	-0.37
			eSn	13:58.60	-0.88
VOY	341.2	279	ePn	18:13:23.70	1.18
			eSn	14:14.30	14.01
GZR	356.3	93	iPnD	18:13:18.20	-6.20
KECS	369.1	28	ePn	18:13:24.50	-1.50
DRGR	373.1	68	iPnD	18:13:22.20	-4.30
MOA	396.7	310	Pn	18:13:31.10	1.66
			Sn	14:18.50	5.89
KBA	412.8	294	Pn	18:13:32.10	0.65
			Sn	14:20.20	4.01
VRAC	436.2	344	iPn	18:13:35.80	1.44
TRPA	436.9	49	iPn	18:13:31.50	-2.96
TREC	465.4	334	ePn	18:13:38.70	0.70
MORC	473.3	354	iPn	18:13:39.90	0.90
OKC	477.3	359	ePn	18:13:39.50	0.01
			eSn	14:29.30	-1.20
KOLS	485.6	39	ePn	18:13:47.40	6.87
STHS	486.9	28	ePn	18:13:41.50	0.81
			eSn	15:04.00	31.38
KHC	531.4	319	ePn	18:13:47.50	1.27
VOIR	533.6	91	iPn	18:13:41.70	-4.81
DPC	552.9	345	ePn	18:13:49.30	0.38
			eSn	14:47.20	-0.08
UPC	576.0	343	ePn	18:13:52.50	0.71
BURB	583.2	67	iPn	18:13:49.40	-3.29

29.

2008-05-15 time: 8:05:13.61 UTC ML= 1.4  
 lat: 47.352N lon: 18.306E h= 10.0 km  
 erh= 4.9km erz= 3.0km  
 nr= 5 gap=172 rms=0.18  
 Locality: Csákberény  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	7.8	55	ePgC	8:05:15.80	-0.07
			eSg	05:17.70	0.07
PKST	23.0	243	ePgD	8:05:18.00	-0.09
			eSg	05:22.20	0.62
PKSM	129.3	169	eSn	8:05:52.50	-0.04

30.

2008-05-22 time: 7:41:28.55 UTC ML= 1.7  
 lat: 48.368N lon: 19.831E h= 0.5 km  
 erh= 1.5km erz= 3.1km  
 nr= 8 gap=121 rms=0.68  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
KECS	50.1	75	ePg	7:41:37.10	-0.41
			eSg	41:43.90	-0.59
PSZ	50.2	175	ePgD	7:41:37.50	-0.02
			eSg	41:44.20	-0.32

## Földrengés paraméterek

VYHS	74.9	281	ePg	7:41:42.10	0.16
			eSg	41:51.40	-0.97
STHS	156.0	42	ePn	7:41:56.30	1.32
			eSn	42:17.70	2.11

31.

2008-05-27 time: 9:45:06.88 UTC ML= 0.8  
 lat: 48.032N lon: 19.542E h= 0.0 km  
 erh= \*\*\*km erz= \*\*\*km  
 nr= 5 gap=199 rms=0.78  
 Locality: Rimóc  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PSZ	29.1	116	ePgD	9:45:11.70	-0.39
			eSg	45:17.30	1.15
VYHS	73.4	314	ePg	9:45:21.10	1.10
			eSg	45:29.40	-0.83
KECS	86.2	54	eSg	9:45:33.70	-0.58

32.

2008-05-27 time: 11:26:28.77 UTC ML= 2.2  
 lat: 48.877N lon: 20.454E h= 0.0 km  
 erh= 3.5km erz= 5.6km  
 nr= 10 gap=153 rms=0.79  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	43.8	177	ePg	11:26:37.00	0.41
			eSg	26:42.50	-0.20
STHS	83.2	44	ePg	11:26:43.90	0.27
			eSg	26:55.20	-0.02
PSZ	114.3	201	ePgC	11:26:50.30	1.12
			eSg	27:04.80	-0.31
VYHS	126.5	250	ePg	11:26:50.50	-0.85
			eSg	27:06.80	-2.17
KOLS	133.5	87	ePn	11:26:52.50	0.05
			eSn	27:08.70	-2.22

33.

2008-05-27 time: 19:13:30.73 UTC ML= 2.5  
 lat: 45.770N lon: 20.586E h= 10.0 km  
 erh= 7.9km erz= 6.8km  
 nr= 20 gap=170 rms=1.23  
 Locality: Serbia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
TIM	49.6	94	iPg	19:13:39.10	-0.66
PKS6	121.3	319	eSn	19:14:06.10	-1.80
PKS2	133.0	307	ePn	19:13:53.20	0.13
			eSn	14:09.50	-0.99
PKSN	136.9	336	ePnD	19:13:53.70	0.14
			eSn	14:12.10	0.73
PKSM	158.4	288	ePnC	19:13:56.20	-0.04
			eSn	14:13.90	-2.24
GZR	176.1	104	iPnD	19:13:58.40	-0.04
PKS7	179.3	322	ePnC	19:14:02.10	3.25
			eSn	14:23.60	2.82
RHK3	181.8	274	ePn	19:13:59.00	-0.16
DRGR	199.3	55	iPnD	19:14:02.70	1.36
PKS9	199.9	297	ePn	19:14:03.20	1.78
			eSn	14:25.50	0.15
PSZ	244.5	348	ePnC	19:14:05.90	-1.08
			eSn	14:31.60	-3.65
PKSG	246.6	317	ePnD	19:14:07.10	-0.13
			eSn	14:42.50	6.80
PKST	256.4	310	ePnD	19:14:08.80	0.35
			eSn	14:35.10	-2.78

## Földrengés paraméterek

## Hypocenter Parameters

34.

2008-06-01 time: 1:09:13.63 UTC ML= 1.6  
 lat: 48.230N lon: 22.477E h= 3.0 km  
 erh= 6.0km erz= 4.6km  
 nr= 9 gap=168 rms=0.42  
 Locality: Gelénes  
 Comments:

sta	dist	azm	phase	hr mn sec	res
TRPA	12.0	157	ePgC	1:09:15.80	-0.03
			eSg	09:17.30	-0.25
KOLS	79.7	349	ePg	1:09:27.90	0.04
			eSg	09:38.60	-0.37
KECS	150.3	281	ePn	1:09:38.60	-0.42
			eSn	09:59.70	0.88
STHS	160.1	326	ePn	1:09:42.00	1.76
			eSn	10:01.90	0.90
VYHS	271.4	276	ePn	1:09:53.60	-0.52

35.

2008-06-06 time: 11:07:16.32 UTC ML= 1.9  
 lat: 47.981N lon: 19.470E h= 0.0 km  
 erh= 9.5km erz=27.0km  
 nr= 6 gap=218 rms=0.73  
 Locality: Herencsény  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PSZ	32.5	102	ePgC	11:07:21.80	-0.59
			eSg	07:27.40	0.28
VYHS	74.0	320	ePg	11:07:31.10	1.45
			eSg	07:38.80	-1.25
KECS	93.9	53	ePg	11:07:33.90	0.72
			eSg	07:45.60	-0.73

36.

2008-06-12 time: 17:04:05.35 UTC ML= 1.8  
 lat: 47.396N lon: 18.532E h= 10.0 km  
 erh= 7.6km erz= 4.6km  
 nr= 6 gap=269 rms=0.34  
 Locality: Csákvár  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	10.7	267	ePgD	17:04:07.80	-0.17
			eSg	04:09.90	-0.11
PKS9	92.0	192	ePg	17:04:22.30	0.42
			Sg	04:34.80	0.02
PKSM	132.0	176	ePn	17:04:27.50	-0.06
			eSn	04:42.90	-1.98

37.

2008-06-12 time: 21:12:44.68 UTC ML= 2.2  
 lat: 45.530N lon: 16.170E h= 8.9 km  
 erh= 2.9km erz= 1.8km  
 nr= 13 gap=192 rms=0.31  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
GCIS	56.5	312	iPg	21:12:55.10	0.21
			eSg	13:02.40	-0.45
CRES	64.6	301	iPg	21:12:56.30	-0.02
			iSg	13:05.00	-0.40
GOLS	68.2	322	iPg	21:12:57.10	0.13
			eSg	13:05.70	-0.85
BOJS	71.8	268	iPg	21:12:57.60	0.00
			eSg	13:06.10	-1.58
LEGS	81.0	305	iPg	21:12:59.10	-0.14
			eSg	13:09.60	-1.00
DOBS	87.8	322	iPg	21:13:00.50	0.07
			eSg	13:11.10	-1.62
KOGS	102.2	3	iPg	21:13:02.70	-0.30
VISS	108.1	286	iP*	21:13:03.60	-0.43

PDKS	109.7	304	iPn	21:13:04.10	-0.15
GROS	115.7	333	iPn	21:13:05.20	0.20
CEY	137.9	280	iSn	21:13:25.90	0.12
SOKA	155.0	325	Pn	21:13:10.90	1.00
			Sn	13:29.70	0.13
OBKA	166.2	311	Pn	21:13:13.70	2.41
			Sn	13:33.00	0.95
RHK3	166.9	76	ePn	21:13:11.60	0.21
			eSn	13:30.00	-2.22
PKS9	201.1	54	ePn	21:13:43.40	3.60
PKSM	206.3	68	ePn	21:13:15.60	-0.70
			eSn	13:38.40	-2.56

38.

2008-06-17 time: 10:44:37.92 UTC ML= 0.9  
 lat: 48.049N lon: 20.290E h= 0.0 km  
 erh= 4.6km erz=34.6km  
 nr= 6 gap=227 rms=0.39  
 Locality: Mikófalva  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PSZ	32.9	244	ePgC	10:44:43.70	-0.14
			eSg	44:48.70	0.24
KECS	50.5	17	ePg	10:44:46.50	-0.46
			eSg	44:54.50	0.49
VYHS	118.7	295	ePg	10:44:59.80	0.66
			eSg	45:15.30	-0.39

39.

2008-06-17 time: 10:57:30.42 UTC ML= 1.6  
 lat: 47.896N lon: 19.386E h= 0.0 km  
 erh= \*\*\*km erz= \*\*\*km  
 nr= 8 gap=127 rms=0.83  
 Locality: Becske  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PENC	14.1	214	ePgC	10:57:32.80	-0.14
			eSg	57:34.80	-0.11
PSZ	38.1	86	ePgD	10:57:37.00	-0.22
			eSg	57:42.70	0.18
VYHS	78.1	328	ePg	10:57:46.30	1.94
			eSg	57:53.80	-1.43
KECS	104.6	51	ePg	10:57:49.60	0.50
			eSg	58:01.60	-2.07

40.

2008-06-19 time: 21:28:39.82 UTC ML= 2.1  
 lat: 46.172N lon: 16.428E h= 6.0 km  
 erh= 2.4km erz= 2.1km  
 nr= 11 gap=142 rms=0.32  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
KOGS	33.7	336	iPgD	21:28:46.40	0.48
			iSg	28:51.20	0.52
BEHE	42.6	39	ePgD	21:28:46.90	-0.60
			eSg	28:52.70	-0.79
GOLS	64.7	254	iPg	21:28:51.60	0.18
GCIS	70.7	241	iPg	21:28:52.60	0.12
			iSg	29:03.40	1.05
GROS	78.3	294	iPg	21:28:53.60	-0.24
CRES	84.5	243	iPg	21:28:54.90	-0.04
LEGS	89.4	254	iPg	21:28:55.70	-0.13
BOJS	117.7	231	iPn	21:29:00.60	-0.17
SOKA	121.2	298	Pn	21:29:01.10	-0.10
			Sn	29:15.90	-1.97
ARSA	138.5	330	Sn	21:29:21.20	-0.51
RHK3	144.7	103	eSn	21:29:17.70	-5.39
PKS9	149.7	72	eSn	21:29:21.50	-2.70
PKSM	170.9	89	ePnC	21:29:08.10	0.70
			eSn	29:26.60	-2.31
PKST	172.3	45	ePn	21:29:04.80	-2.77
PKS2	217.4	81	eSn	21:29:41.90	2.67

## Hypocenter Parameters

## Földrengés paraméterek

41.

2008-06-20 time: 10:09:27.32 UTC ML= 1.3  
 lat: 46.994N lon: 18.471E h= 2.9 km  
 erh= 1.9km erz=33.7km  
 nr= 6 gap=179 rms=1.33  
 Locality: Soponya  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKST	44.3	312	ePgC	10:09:35.60	0.35
			eSg	09:38.60	-2.83
PKSG	44.6	352	ePgC	10:09:36.10	0.80
			eSg	09:38.90	-2.62
PKSM	88.0	171	ePg	10:09:44.50	1.46
			eSg	09:54.90	-0.40

42.

2008-06-23 time: 10:59:06.58 UTC ML= 1.8  
 lat: 47.899N lon: 19.391E h= 0.0 km  
 erh= 5.0km erz= 3.7km  
 nr= 10 gap=127 rms=0.94  
 Locality: Becske  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PENC	14.6	214	ePgC	10:59:09.70	-0.37
			eSg	59:13.00	0.20
PSZ	37.7	87	ePgD	10:59:13.40	-0.30
			eSg	59:18.70	-0.56
VYHS	77.9	328	ePg	10:59:22.70	2.01
			eSg	59:30.50	-1.20
KECS	104.1	51	ePn	10:59:25.90	0.97
			eSn	59:38.50	-0.74
KOLL	105.4	316	ePn	10:59:25.00	-0.08
			eSn	59:38.10	-1.41

43.

2008-06-24 time: 10:58:31.45 UTC ML= 2.0  
 lat: 48.364N lon: 19.842E h= 0.0 km  
 erh= 2.6km erz= 5.0km  
 nr= 9 gap=119 rms=0.77  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	49.5	74	ePg	10:58:39.70	-0.59
			eSg	58:47.40	0.22
PSZ	49.7	175	ePgC	10:58:40.00	-0.32
			eSg	58:47.40	0.16
VYHS	75.8	281	ePg	10:58:44.60	-0.39
			eSg	58:54.50	-1.05
KOLL	109.1	283	ePg	10:58:52.10	1.17
			eSg	59:05.70	-0.42
STHS	155.8	41	eSn	10:59:20.30	1.74

44.

2008-06-25 time: 1:22:55.94 UTC ML= 2.5  
 lat: 47.557N lon: 21.939E h= 11.3 km  
 erh= 4.0km erz= 4.9km  
 nr= 10 gap=110 rms=0.39  
 Locality: Vámospércs  
 Comments: felt 4-5 EMS

sta	dist	azm	phase	hr mn sec	res
TRPA	78.0	35	iPg	1:23:09.80	-0.21
			eSg	23:21.90	0.92
DRGR	103.3	145	iP*	1:23:14.20	-0.14
KECS	149.5	314	iPn	1:23:19.90	-0.27
			iSn	23:39.10	0.03
CRVS	153.7	347	iPn	1:23:20.40	-0.29
PSZ	158.5	285	iPn	1:23:21.80	0.51
			eSn	23:41.00	-0.07
PENC	201.2	277	eSn	1:23:55.30	4.75

BZS	217.1	187	iPn	1:23:28.50	-0.10
GZR	249.0	165	iPn	1:23:33.80	1.23
PKS9	298.2	249	ePn	1:23:34.00	-4.71

45.

2008-07-01 time: 11:15:59.61 UTC ML= 1.6  
 lat: 47.862N lon: 19.839E h= 5.9 km  
 erh= 8.4km erz= 8.9km  
 nr= 8 gap=224 rms=0.91  
 Locality: Gyöngyösoroszi  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PSZ	7.5	34	ePgC	11:16:00.90	-0.42
			eSg	16:03.00	0.34
PENC	42.5	259	ePgC	11:16:06.40	-0.87
			eSg	16:14.10	0.86
KECS	84.2	35	ePg	11:16:16.30	1.62
			eSg	16:25.90	-0.54
VYHS	102.5	313	ePg	11:16:18.90	0.96
			eSg	16:30.50	-1.74

46.

2008-07-02 time: 9:16:06.41 UTC ML= 1.1  
 lat: 46.946N lon: 18.440E h= 0.0 km  
 erh= \*\*\*km erz= \*\*\*km  
 nr= 5 gap=174 rms=1.11  
 Locality: Kisláng  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKST	46.5	318	ePgC	9:16:15.20	0.48
			eSg	16:18.30	-2.89
PKSG	49.7	356	ePgC	9:16:15.60	0.31
			eSg	16:18.90	-3.32
PKSM	83.0	169	eSg	9:16:33.20	0.40

47.

2008-07-02 time: 9:59:22.88 UTC ML= 1.0  
 lat: 47.478N lon: 18.658E h= 0.0 km  
 erh= 7.1km erz= 301km  
 nr= 5 gap=236 rms=0.16  
 Locality: Bicske  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKSG	22.3	245	ePgC	9:59:26.90	0.04
			eSg	59:29.90	-0.06
PKST	53.0	243	ePgD	9:59:32.40	0.06
			eSg	59:38.10	-1.62
VYHS	113.8	7	ePg	9:59:43.10	-0.10

48.

2008-07-02 time: 11:17:43.70 UTC ML= 0.9  
 lat: 47.074N lon: 17.930E h= 0.0 km  
 erh= 2.6km erz= 273km  
 nr= 5 gap=231 rms=0.12  
 Locality: Veszprém  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PKST	22.1	21	ePgC	11:17:47.60	-0.04
			eSg	17:51.10	0.39
PKSG	49.7	45	ePgC	11:17:52.50	-0.07
			eSg	17:59.40	-0.10
PKSM	110.2	150	eSg	11:18:18.80	0.06

## Földrengés paraméterek

49.

2008-07-02 time: 15:54:21.49 UTC ML= 3.6  
 lat: 46.468N lon: 16.174E h= 5.9 km  
 erh= 2.3km erz= 2.0km  
 nr= 25 gap=102 rms=0.65  
 Locality: Slovenia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
KOGS	6.3	110	iPg	15:54:23.10	0.08
			iSg	54:24.60	0.38
GROS	51.6	269	iPg	15:54:31.20	0.44
			iSg	54:38.30	0.30
DOBS	64.8	237	iPg	15:54:33.30	0.20
GOLS	66.1	220	iPg	15:54:33.70	0.35
			iSg	54:42.70	0.11
CESS	77.6	225	iPg	15:54:35.70	0.31
			iSg	54:45.80	-0.43
GCIS	79.0	212	iPg	15:54:35.50	-0.13
BISS	82.7	284	iPg	15:54:36.00	-0.29
PERS	83.2	283	ePg	15:54:36.40	0.02
			iSg	54:47.30	-0.69
LEGS	87.7	229	iPg	15:54:37.20	0.02
			eSg	54:48.70	-0.73
CRES	90.3	218	ePg	15:54:37.60	-0.05
			eSg	54:48.70	-1.56
SOKA	90.5	285	Pg	15:54:37.30	-0.39
			Sg	54:51.90	1.58
ARSA	100.1	330	Pg	15:54:38.40	-1.00
			Sg	54:53.60	0.23
PKKS	100.4	245	iPg	15:54:39.50	0.05
			iSg	54:54.00	0.54
OBKA	124.8	272	Pn	15:54:43.40	0.06
			Sn	55:00.20	-0.18
VISS	126.8	234	iPn	15:54:43.00	-0.59
			eSn	54:58.80	-2.03
BOJS	128.7	214	iPn	15:54:43.10	-0.72
LJU	135.4	250	iPn	15:54:45.30	0.64
			iSn	55:03.70	0.97
PKS9	162.1	85	ePnD	15:54:48.90	0.92
			eSn	55:09.40	0.75
CSNA	164.1	352	Pn	15:54:49.10	0.87
CONA	164.1	352	Pn	15:54:48.10	-0.14
			Sn	55:11.80	2.70
PKST	166.9	58	ePnD	15:54:46.80	-1.79
			eSn	55:11.50	1.77
PKSM	192.1	99	ePnC	15:54:49.00	-2.73
			eSn	55:17.10	1.78
PKSG	197.6	59	ePn	15:54:54.50	2.08
			eSn	55:20.40	3.86
ZST	204.6	20	e n	15:54:57.70	4.42
MOA	211.0	317	Pn	15:54:55.20	1.12
			Sn	55:20.20	0.70
KBA	226.5	287	Pn	15:54:56.90	0.89
			Sn	55:29.40	6.46
PKS2	233.4	89	eSn	15:55:29.70	5.21
SMOL	246.4	23	e n	15:55:04.40	5.91
PKS6	260.6	87	eSn	15:55:38.20	7.69
PENC	277.9	58	ePnC	15:55:08.40	5.97
KOLL	288.5	36	eSn	15:55:31.50	-5.21
VYHS	301.7	42	ePn	15:55:05.80	0.41
			eSn	55:36.40	-3.24
PSZ	324.8	60	ePn	15:55:15.00	6.72
			eSn	56:01.00	16.23
KHC	354.2	327	ePn	15:55:13.30	1.36
			eSn	55:50.40	-0.90
MORC	381.8	15	iPnD	15:55:15.40	0.02
KECS	394.8	55	ePn	15:55:16.20	-0.80
NKC	501.6	327	ePn	15:55:31.10	0.79
			eSn	56:43.00	19.00

## Hypocenter Parameters

50.

2008-07-09 time: 10:39:00.01 UTC ML= 2.1  
 lat: 48.901N lon: 20.456E h= 0.0 km  
 erh= \*\*\*km erz= \*\*\*km  
 nr= 10 gap=156 rms=0.99  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	46.5	177	ePg	10:39:08.70	0.38
			eSg	39:14.30	-0.50
CRVS	73.7	90	ePg	10:39:13.50	0.33
			eSg	39:22.10	-1.33
STHS	81.1	45	ePg	10:39:15.30	0.80
			eSg	39:23.60	-2.20
PSZ	116.9	201	ePgD	10:39:22.10	1.21
			eSg	39:36.70	-0.48
VYHS	127.6	249	ePg	10:39:22.90	0.11
			eSg	39:38.30	-2.26

51.

2008-07-11 time: 20:25:39.54 UTC ML= 3.6  
 lat: 46.053N lon: 21.051E h= 10.0 km  
 erh= ---km erz= ---km  
 nr= 4 gap=142 rms=0.72  
 Locality: Romania  
 Comments:

sta	dist	azm	phase	hr mn sec	res
BZS	65.5	138	iPg	20:25:50.90	-0.47
DRGR	151.7	57	iPn	20:26:03.70	-0.51
GZR	153.1	119	iPn	20:26:05.70	1.32
PKSM	187.1	275	iPnD	20:26:08.60	-0.02

52.

2008-07-15 time: 19:59:06.04 UTC ML= 1.9  
 lat: 47.516N lon: 21.880E h= 7.4 km  
 erh= 5.9km erz= 7.5km  
 nr= 10 gap=145 rms=0.78  
 Locality: Vámospércs  
 Comments: felt 4-5 EMS

sta	dist	azm	phase	hr mn sec	res
TRPA	84.3	36	iPg	19:59:21.08	-0.07
			iSg	59:31.80	-1.13
DRGR	102.3	142	iPg	19:59:24.86	0.50
			iSg	59:38.70	0.06
KECS	149.6	316	iPn	19:59:31.20	0.42
			iSn	59:49.70	-0.38
PSZ	155.5	287	iPn	19:59:31.40	-0.12
			iSn	59:50.10	-1.29
CRVS	157.2	349	iPn	19:59:33.48	1.75
			iSn	59:52.40	0.64

53.

2008-07-30 time: 10:09:32.75 UTC ML= 2.2  
 lat: 46.981N lon: 22.212E h= 6.1 km  
 erh= 0.6km erz= 0.7km  
 nr= 5 gap=174 rms=0.54  
 Locality: Romania  
 Comments:

sta	dist	azm	phase	hr mn sec	res
DRGR	43.5	119	iPg	10:09:40.30	-0.30
TRPA	130.1	11	iPn	10:09:55.00	-0.23
BZS	158.5	197	iPn	10:09:58.90	0.13
BURB	237.9	73	iPnD	10:10:10.30	1.63
VOIR	278.3	128	iPn	10:10:15.80	2.10

## Hypocenter Parameters

## Földrengés paraméterek

54.

2008-07-31 time: 9:29:20.85 UTC ML= 1.8  
 lat: 47.896N lon: 19.400E h= 0.0 km  
 erh= 4.4km erz= 6.6km  
 nr= 7 gap=126 rms=0.78  
 Locality: Bercel  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PSZ	37.0	86	ePgD	9:29:27.30			-0.40
			eSg	29:33.00			-0.04
BUD	53.8	212	eSg	9:29:38.00			-0.26
VYHS	78.7	328	ePg	9:29:36.50			1.49
			eSg	29:44.20			-1.86
KECS	103.8	51	eP*	9:29:40.00			0.54
			eS*	29:53.80			-0.17

55.

2008-07-31 time: 9:39:50.93 UTC ML= 2.0  
 lat: 48.360N lon: 19.860E h= 0.0 km  
 erh= 0.8km erz= 1.3km  
 nr= 8 gap=118 rms=0.18  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
KECS	48.3	74	ePg	9:39:59.60			0.02
			eSg	40:06.10			-0.24
PSZ	49.2	177	ePgD	9:39:59.90			0.16
			eSg	40:06.40			-0.21
VYHS	77.2	281	ePg	9:40:04.80			0.07
			eSg	40:14.20			-1.30
KOLL	110.5	283	eSg	9:40:26.10			0.03
STHS	155.3	41	eSn	9:40:37.00			0.04

56.

2008-07-31 time: 19:48:03.54 UTC ML= 1.1  
 lat: 48.075N lon: 20.237E h= 7.0 km  
 erh= 5.4km erz= 2.8km  
 nr= 6 gap=214 rms=0.18  
 Locality: Szentdomonkos  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PSZ	30.9	236	ePg	19:48:09.40			0.20
			eSg	48:13.30			-0.31
KECS	49.0	22	ePg	19:48:12.20			-0.19
			eSg	48:19.50			0.21
VYHS	113.9	294	ePn	19:48:23.90			0.01
			eSn	48:39.80			0.04

57.

2008-08-01 time: 7:29:59.35 UTC ML= 1.2  
 lat: 48.269N lon: 19.835E h= 0.0 km  
 erh= 2.3km erz= 637km  
 nr= 6 gap=135 rms=0.37  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PSZ	39.3	174	ePgC	7:30:06.30			-0.06
			eSg	30:11.90			0.07
KECS	53.7	64	ePg	7:30:08.80			-0.15
			eSg	30:16.30			-0.14
VYHS	78.1	289	ePg	7:30:13.90			0.60
			eSg	30:23.40			-0.78

58.

2008-08-01 time: 8:06:04.32 UTC ML= 1.7  
 lat: 48.617N lon: 20.716E h= 0.0 km  
 erh= 7.1km erz= 4.5km  
 nr= 7 gap=195 rms=0.28  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
KECS	22.6	229	ePg	8:06:07.90			-0.45
			eSg	06:11.70			0.20
STHS	97.0	23	eSg	8:06:35.30			0.15
PSZ	98.7	218	ePgC	8:06:22.10			0.15
			eSg	06:35.70			-0.01
VYHS	139.4	264	ePn	8:06:28.90			0.16
			eSn	06:46.90			-0.89

59.

2008-08-01 time: 9:51:38.00 UTC ML= 2.1  
 lat: 47.005N lon: 22.181E h= 0.8 km  
 erh= 5.4km erz= 5.4km  
 nr= 6 gap=176 rms=0.48  
 Locality: Romania  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
DRGR	46.9	120	iPg	9:51:46.00			-0.37
TRPA	128.0	12	iPgD	9:52:00.50			-0.35
BZS	160.3	196	iPn	9:52:04.60			-0.33
GZR	185.0	166	iPn	9:52:09.00			1.00
BURB	239.4	74	iPn	9:52:15.10			0.32
VOIR	281.7	128	iPn	9:52:20.00			-0.06

60.

2008-08-02 time: 7:27:43.07 UTC ML= 1.5  
 lat: 45.908N lon: 18.645E h= 0.7 km  
 erh= 3.6km erz= 116km  
 nr= 6 gap=267 rms=0.28  
 Locality: Udvar  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	30.6	266	ePgD	7:27:48.60			0.06
			eSg	27:52.30			-0.50
PKSM	33.8	359	ePg	7:27:49.30			0.18
			eSg	27:53.20			-0.63
PKS9	80.6	339	ePg	7:27:57.40			-0.07
			eSg	28:09.20			0.49

61.

2008-08-06 time: 15:50:02.78 UTC ML= 1.6  
 lat: 46.051N lon: 18.429E h= 13.1 km  
 erh= 2.2km erz= 3.0km  
 nr= 5 gap=175 rms=0.16  
 Locality: Kátoly  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	22.7	217	ePgC	15:50:07.50			0.05
			eSg	50:11.10			0.00
PKSM	24.3	43	ePgD	15:50:07.90			0.20
			eSg	50:11.30			-0.25
PKS9	60.7	349	Pg	15:50:13.70			-0.16
			Sg	50:28.00			5.49

62.

2008-08-12 time: 8:49:31.19 UTC ML= 1.7  
 lat: 47.875N lon: 20.582E h= 0.0 km  
 erh= 3.5km erz= 2.4km  
 nr= 5 gap=246 rms=0.51  
 Locality: Tard  
 Comments: probably explosion



## Földrengés paraméterek

## Hypocenter Parameters

sta	dist	azm	phase	hr mn sec	res
PSZ	51.7	275	ePg	8:49:40.60	0.17
			eSg	49:46.80	-0.83
KECS	68.0	354	ePg	8:49:43.90	0.56
			eSg	49:51.80	-1.02
CRVS	131.5	30	eSn	8:50:12.30	-0.01

63.

2008-08-12 time: 11:03:49.31 UTC ML= 1.6  
 lat: 48.006N lon: 19.504E h= 1.2 km  
 erh= 9.5km erz= 304km  
 nr= 6 gap=209 rms=0.91  
 Locality: Nógrádsipek  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PSZ	30.7	108	ePgD	11:03:54.00	-0.80
			eSg	03:59.80	0.72
VYHS	73.6	318	ePg	11:04:03.30	0.86
			eSg	04:10.90	-1.79
KECS	90.2	54	ePg	11:04:06.20	0.78
			eSg	04:18.70	0.72

64.

2008-08-14 time: 10:18:04.96 UTC ML= 1.8  
 lat: 47.961N lon: 19.222E h= 0.0 km  
 erh= 4.4km erz= 623km  
 nr= 6 gap=239 rms=0.36  
 Locality: Szátok  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
PSZ	50.5	95	ePg	10:18:13.50	-0.47
			eSg	18:21.60	0.60
VYHS	65.9	334	ePg	10:18:17.10	0.38
			eSg	18:25.60	-0.29
KECS	110.4	58	ePg	10:18:24.60	-0.07
			eSg	18:40.10	0.05

65.

2008-08-14 time: 11:15:36.90 UTC ML= 1.8  
 lat: 48.837N lon: 20.576E h= 0.0 km  
 erh= 3.1km erz= 2.8km  
 nr= 9 gap=144 rms=0.42  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	39.9	190	ePg	11:15:44.20	0.02
			eSg	15:49.50	-0.35
CRVS	65.3	84	ePg	11:15:48.90	0.24
			eSg	15:57.70	-0.13
STHS	80.8	37	ePg	11:15:51.10	-0.31
PSZ	113.9	206	ePnC	11:15:57.70	0.63
			eSn	16:12.00	-0.80
VYHS	133.8	253	ePn	11:15:59.70	0.16
			eSn	16:13.80	-3.40

66.

2008-08-17 time: 5:00:50.96 UTC ML= 2.6  
 lat: 45.542N lon: 21.182E h= 10.0 km  
 erh= 6.6km erz= 4.9km  
 nr= 34 gap=126 rms=1.75  
 Locality: Romania  
 Comments:

sta	dist	azm	phase	hr mn sec	res
TIM	21.9	8	iPg	5:00:56.90	1.64
BZS	34.9	76	iPgD	5:00:57.20	-0.25
DEV	139.3	74	iPn	5:01:13.30	-0.79
PKS6	171.8	313	ePnC	5:01:16.70	-1.43
			eSn	01:38.20	-1.13
DRGR	182.4	40	iPnD	5:01:19.20	-0.26

PKS2	185.5	305	ePn	5:01:18.30	-1.55
PKSM	210.9	291	ePnD	5:01:21.10	-1.91
			eSn	01:52.80	4.79
PKS7	228.6	317	ePnC	5:01:25.30	0.07
			eSn	01:57.30	5.35
RHK3	231.4	280	ePnC	5:01:22.00	-3.57
			eSn	01:55.00	2.44
PKS9	252.9	297	ePn	5:01:30.60	2.34
			eSn	02:05.10	7.76
BUD	272.1	323	ePnC	5:01:28.40	-2.25
			eSn	02:18.20	16.60
PSZ	282.0	340	ePnD	5:01:31.70	-0.18
			eSn	02:03.70	-0.09
PKSG	297.1	314	ePn	5:01:32.50	-1.27
VOIR	302.6	92	iPnD	5:01:35.00	0.56
TRPA	305.9	20	iPn	5:01:35.10	0.25
BEHE	356.6	287	eSn	5:02:35.50	15.15
VTS	365.8	154	iPn	5:01:43.30	0.98
MLR	372.2	91	iPnD	5:01:44.00	0.87
VYHS	373.6	331	ePn	5:01:43.30	0.00
			eSn	02:22.40	-1.72
CRVS	374.2	3	ePn	5:01:44.20	0.82
			eSn	02:21.60	-2.66
BURA	385.7	53	PnC	5:01:45.33	0.52
BURB	385.7	53	iPn	5:01:45.30	0.49
KOLL	398.3	328	ePn	5:01:46.10	-0.28
SOP	426.8	304	eSn	5:02:32.30	-3.63
ZST	428.8	313	ePn	5:01:50.10	-0.08
STHS	430.9	1	ePn	5:01:51.00	0.56
VRI	433.4	85	iPn	5:01:51.50	0.74

67.

2008-08-25 time: 7:43:44.53 UTC ML= 2.2  
 lat: 48.368N lon: 19.840E h= 0.0 km  
 erh= 2.7km erz= 3.9km  
 nr= 11 gap=119 rms=0.67  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	49.5	75	ePg	7:43:53.10	-0.27
			eSg	43:59.80	-0.46
PSZ	50.1	175	ePgC	7:43:53.60	0.12
			eSg	44:00.70	0.24
VYHS	75.6	281	ePg	7:43:57.90	-0.13
			eSg	44:07.60	-0.95
KOLL	108.8	282	ePg	7:44:04.80	0.84
			eSg	44:18.50	-0.63
CRVS	133.5	64	eSn	7:44:25.60	-1.08
STHS	155.6	41	ePn	7:44:12.20	1.24
			eSn	44:32.60	1.02

68.

2008-08-25 time: 11:28:08.63 UTC ML= 1.6  
 lat: 47.958N lon: 19.379E h= 10.0 km  
 erh=10.0km erz=39.4km  
 nr= 7 gap=217 rms=1.01  
 Locality: Cserhátaláp  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PSZ	38.8	97	ePgD	11:28:15.50	-0.28
			eSg	28:21.20	-0.16
VYHS	71.9	326	ePg	11:28:23.50	1.91
			eSg	28:32.20	0.49
KOLL	100.1	314	eSg	11:28:39.40	-1.19
KECS	100.8	55	ePg	11:28:27.40	0.68
			eSg	28:39.20	-1.64

69.

2008-08-25 time: 18:09:05.23 UTC ML= 1.2  
 lat: 45.930N lon: 18.621E h= 0.5 km  
 erh= 1.7km erz= 105km  
 nr= 5 gap=258 rms=0.30  
 Locality: Sátorhely  
 Comments:

## Hypocenter Parameters

sta	dist	azm	phase	hr	mn	sec	res
RHK3	29.0	261	ePgD	18:09:10.50			0.09
			eSg	09:13.60			-0.85
PKSM	31.4	3	ePgC	18:09:10.80			-0.04
			eSg	09:14.80			-0.41
PKS9	77.7	340	eSg	18:09:30.30			0.38

70.

2008-09-03 time: 10:40:51.71 UTC ML= 1.7  
 lat: 48.585N lon: 20.799E h= 0.0 km  
 erh= 4.4km erz= 5.2km  
 nr= 9 gap=168 rms=0.59  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
KECS	25.8	244	ePg	10:40:55.90			-0.41
			eSg	40:59.90			0.00
CRVS	60.1	54	ePg	10:41:02.90			0.46
			eSg	41:10.30			-0.52
STHS	98.0	19	ePg	10:41:10.30			1.09
			eSg	41:21.70			-1.16
PSZ	100.1	222	iPg	10:41:09.90			0.32
VYHS	145.3	266	ePn	10:41:16.60			-0.26
			eSn	41:34.10			-2.38

71.

2008-09-05 time: 9:44:05.03 UTC ML= 2.3  
 lat: 45.565N lon: 18.057E h= 0.4 km  
 erh= \*\*\*km erz= \*\*\*km  
 nr= 5 gap=336 rms=1.17  
 Locality: Croatia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	39.1	23	ePgD	9:44:12.50			0.49
			eSg	44:14.20			-3.25
PKSM	85.0	32	ePgC	9:44:19.90			-0.32
			eSg	44:33.80			1.74
PKS9	114.9	9	eSg	9:44:41.60			0.04

72.

2008-09-08 time: 8:43:25.74 UTC ML= 1.5  
 lat: 48.386N lon: 19.832E h= 5.1 km  
 erh= 1.2km erz= 1.6km  
 nr= 8 gap=145 rms=0.23  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
KECS	49.5	77	ePg	8:43:34.60			-0.04
			eSg	43:41.70			0.13
PSZ	52.2	175	ePgD	8:43:35.10			-0.01
			eSg	43:41.80			-0.61
VYHS	74.7	279	ePg	8:43:39.50			0.39
			eSg	43:49.10			-0.44
PENC	77.9	212	eSg	8:43:50.70			0.15
CRVS	133.1	64	eSn	8:44:06.50			-0.14

73.

2008-09-08 time: 10:41:19.19 UTC ML= 1.8  
 lat: 47.909N lon: 19.376E h= 0.0 km  
 erh= 1.7km erz= 579km  
 nr= 9 gap=120 rms=0.44  
 Locality: Becske  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PENC	14.9	208	ePgC	10:41:21.80			-0.06
			eSg	41:27.50			3.56
PSZ	38.8	88	ePgD	10:41:25.70			-0.41
			eSg	41:31.40			-0.11
BUD	54.2	209	eSg	10:41:36.20			-0.21

## Földrengés paraméterek

sta	dist	azm	phase	hr	mn	sec	res
VYHS	76.5	328	ePg	10:41:33.30			0.46
			eSg	41:42.80			-0.69
KECS	104.3	52	ePg	10:41:38.20			0.38
			eSg	41:52.60			0.25

74.

2008-09-11 time: 12:46:35.83 UTC ML= 1.7  
 lat: 48.034N lon: 19.556E h= 0.0 km  
 erh= ---km erz= ---km  
 nr= 4 gap=197 rms=0.61  
 Locality: Nagylóc  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PSZ	28.4	117	ePgC	12:46:40.60			-0.30
VYHS	74.0	314	ePg	12:46:50.00			0.96
			eSg	46:58.20			-1.14
KECS	85.2	54	eSg	12:47:03.10			0.19

75.

2008-09-16 time: 7:10:28.98 UTC ML= 1.6  
 lat: 47.952N lon: 19.819E h= 0.0 km  
 erh= \*\*\*km erz= \*\*\*km  
 nr= 9 gap=123 rms=0.83  
 Locality: Mátraverebély  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PSZ	6.8	123	ePgC	7:10:29.50			-0.69
			eSg	10:32.20			1.06
PENC	44.0	246	ePgC	7:10:36.30			-0.53
			eSg	10:45.00			2.04
KECS	77.1	40	ePg	7:10:43.50			0.75
			eSg	10:53.80			0.31
VYHS	94.7	310	ePg	7:10:46.90			1.02
			eSg	10:59.50			0.43
KOLL	126.1	304	eSg	7:11:08.10			-0.97

76.

2008-09-18 time: 10:38:28.98 UTC ML= 1.5  
 lat: 47.954N lon: 19.426E h= 0.0 km  
 erh= \*\*\*km erz= \*\*\*km  
 nr= 6 gap=227 rms=0.94  
 Locality: Terény  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PSZ	35.2	97	ePgD	10:38:34.50			-0.77
			eSg	38:40.10			-0.08
VYHS	74.3	324	ePg	10:38:43.70			1.45
			eSg	38:51.30			-1.30
KECS	98.3	53	ePg	10:38:47.00			0.47
			eSg	38:59.40			-0.81

77.

2008-09-20 time: 15:21:54.57 UTC ML= 1.8  
 lat: 45.941N lon: 18.614E h= 0.3 km  
 erh= 0.1km erz= 8.8km  
 nr= 5 gap=254 rms=0.15  
 Locality: Nagynyárad  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	28.7	258	ePgD	15:21:59.70			0.01
			eSg	22:03.30			-0.38
PKSM	30.2	4	ePgC	15:22:00.00			0.04
			eSg	23:03.80			-0.37
PKS9	76.3	340	Sg	15:22:19.00			0.17

## Földrengés paraméterek

## Hypocenter Parameters

78.

2008-09-22 time: 7:53:54.81 UTC ML= 1.0  
 lat: 48.542N lon: 19.405E h= 0.0 km  
 erh= 1.1km erz= 1.3km  
 nr= 6 gap=172 rms=1.06  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
VYHS	42.4	263	ePg	7:54:02.00	-0.38
			eSg	54:08.00	-0.28
PSZ	78.3	152	ePg	7:54:08.70	-0.10
KECS	80.1	95	ePg	7:54:08.80	-0.32
			eSg	54:19.60	-0.68
CRVS	156.5	75	eSn	7:54:45.80	3.73

79.

2008-09-22 time: 8:30:10.35 UTC ML= 1.5  
 lat: 47.923N lon: 19.819E h= 0.0 km  
 erh= 5.1km erz= 882km  
 nr= 6 gap=215 rms=0.51  
 Locality: Mátraszentimre  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PSZ	5.7	96	ePgC	8:30:11.00	-0.37
			eSg	30:12.90	0.74
KECS	79.6	39	ePg	8:30:25.10	0.54
			eSg	30:35.00	-0.65
VYHS	96.7	311	ePg	8:30:28.10	0.48
			eSg	30:40.50	-0.60

80.

2008-10-09 time: 11:54:43.57 UTC ML= 1.8  
 lat: 48.230N lon: 21.188E h= 11.5 km  
 erh= 6.8km erz= 4.3km  
 nr= 10 gap=205 rms=0.88  
 Locality: Golop  
 Comments:

sta	dist	azm	phase	hr mn sec	res
KECS	59.2	298	ePg	11:54:54.10	-0.23
			eSg	55:02.60	-0.13
CRVS	77.4	15	ePg	11:54:58.30	0.76
			eSg	55:07.10	-1.34
PSZ	102.5	250	eP*	11:54:53.20	-8.62
			eS*	55:16.10	0.04
KOLS	111.9	46	ePn	11:55:03.20	0.12
			eSn	55:17.60	-0.70
STHS	132.0	2	ePn	11:55:06.50	0.91
			eSn	55:22.60	-0.17

81.

2008-10-14 time: 5:21:21.99 UTC ML= 2.6  
 lat: 47.869N lon: 16.270E h= 2.9 km  
 erh= 1.9km erz= 1.9km  
 nr= 25 gap=128 rms=0.77  
 Locality: Austria  
 Comments:

sta	dist	azm	phase	hr mn sec	res
SOP	29.9	134	ePgC	5:21:27.70	0.34
			eSg	21:31.50	-0.05
CONA	31.1	282	Pg	5:21:27.50	-0.07
			Sg	21:32.20	0.27
CSNA	31.4	282	Pg	5:21:27.50	-0.12
			Sg	21:32.20	0.18
ZST	72.0	60	ePg	5:21:35.40	0.54
			eSg	21:44.00	-0.89
ARSA	88.8	219	Pg	5:21:37.40	-0.46
			Sg	21:48.80	-1.43
SMOL	112.1	50	ePg	5:21:42.40	0.38
			eSg	21:56.40	-1.24
PKST	149.1	117	ePnD	5:21:46.80	-0.45

			eSn	22:07.30	0.36
MOA	149.9	269	Pn	5:21:47.30	-0.05
			Sn	22:06.50	-0.62
SOKA	162.2	215	Pn	5:21:49.90	1.03
			Sn	22:09.00	-0.83
PKSG	168.0	108	ePn	5:21:50.60	1.00
			eSn	22:09.90	-1.24
OBKA	199.7	221	Pn	5:21:55.70	2.15
			Sn	22:17.90	-0.26
VYHS	203.1	70	ePn	5:21:53.20	-0.78
KBA	237.4	248	Pn	5:21:59.90	1.65
			Sn	22:26.20	-0.33
PKSM	257.8	136	eSn	5:22:44.40	13.35
KECS	320.9	78	ePn	5:22:08.20	-0.47

82.

2008-10-14 time: 7:08:53.90 UTC ML= 1.7  
 lat: 47.834N lon: 16.235E h= 2.5 km  
 erh= 1.5km erz= 1.6km  
 nr= 10 gap=194 rms=0.28  
 Locality: Austria  
 Comments:

sta	dist	azm	phase	hr mn sec	res
SOP	29.5	125	ePgD	7:08:59.30	0.12
			eSg	09:03.00	-0.30
CONA	29.7	291	Pg	7:08:58.90	-0.33
			Sg	09:03.60	0.22
CSNA	30.0	290	Pg	7:08:59.00	-0.27
			Sg	09:03.70	0.24
ARSA	84.1	220	Pg	7:09:09.40	0.48
			Sg	09:20.30	-0.34
MOA	147.4	271	Pn	7:09:19.10	0.11
			Sn	09:38.50	-0.06

83.

2008-10-14 time: 19:59:53.68 UTC ML= 1.5  
 lat: 48.312N lon: 22.277E h= 0.0 km  
 erh= 3.0km erz= 2.7km  
 nr= 9 gap=136 rms=0.30  
 Locality: Lónya  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
TRPA	28.1	136	iPg	19:59:58.79	0.09
KOLS	69.0	360	ePg	19:60:05.61	-0.39
			eSg	60:17.10	1.48
CRVS	89.0	317	ePg	19:60:09.67	0.10
KECS	134.0	278	ePn	19:60:17.07	-0.28
			eSn	60:36.30	0.49
STHS	144.3	328	ePn	19:60:19.10	0.47
DRGR	172.2	169	iPn	19:60:21.95	-0.16
VYHS	255.6	275	ePn	19:60:32.50	-0.01

84.

2008-10-14 time: 21:00:01.90 UTC ML= 1.5  
 lat: 47.275N lon: 20.788E h= 0.0 km  
 erh= 5.6km erz= 7.6km  
 nr= 8 gap= 83 rms=0.58  
 Locality: Kisújszállás  
 Comments: explosion (700 kg)

sta	dist	azm	phase	hr mn sec	res
PSZ	98.1	317	ePgC	21:00:19.85	0.43
			eSg	00:33.70	0.61
KECS	136.2	350	ePn	21:00:25.48	-0.44
DRGR	155.7	110	ePn	21:00:27.97	-0.38
TRPA	162.2	54	ePnC	21:00:29.70	0.54
CRVS	187.7	15	iPn	21:00:31.60	-0.74
BZS	195.0	161	ePn	21:00:33.70	0.45
PKSM	202.2	234	ePn	21:00:31.90	-2.25

## Hypocenter Parameters

## Földrengés paraméterek

85.  
 2008-10-14 time: 21:31:27.44 UTC ML= 1.8  
 lat: 48.543N lon: 22.683E h= 0.0 km  
 erh= 3.2km erz= 2.6km  
 nr= 10 gap=153 rms=0.46  
 Locality: Ukraine  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
TRPA	47.1	193	iPg	21:31:36.00			0.07
KOLS	52.9	325	ePg	21:31:36.70			-0.25
			eSg	31:43.60			-0.77
CRVS	98.4	294	ePg	21:31:45.00			-0.05
			eSg	31:59.80			1.02
STHS	143.4	313	ePn	21:31:52.20			0.68
KECS	162.5	268	ePn	21:31:53.20			-0.70
			eSn	32:16.20			1.65
DRGR	194.7	179	iPnD	21:31:57.70			-0.22
BURB	215.2	119	iPn	21:32:00.60			0.13

86.  
 2008-10-15 time: 21:00:23.57 UTC ML= 2.0  
 lat: 47.755N lon: 21.449E h= 0.0 km  
 erh= 3.8km erz= 4.8km  
 nr= 19 gap= 51 rms=1.06  
 Locality: Hajdúvid  
 Comments: explosion (400 kg)

sta	dist	azm	phase	hr	mn	sec	res
TRPA	91.5	63	ePgC	21:00:40.31			0.40
KECS	108.1	318	ePg	21:00:43.44			0.56
PSZ	117.8	279	ePgC	21:00:43.64			-0.96
			eSg	01:01.40			0.40
CRVS	127.5	0	ePg	21:00:45.40			-0.94
			eSg	01:03.80			-0.31
DRGR	143.5	138	iPnD	21:00:48.59			0.09
KOLS	144.5	25	ePn	21:00:49.10			0.48
			eSn	01:10.30			2.13
PKSN	152.9	231	ePnC	21:00:50.40			0.73
PKS6	192.1	228	ePnC	21:00:56.70			2.15
VYHS	211.1	293	ePn	21:00:56.10			-0.83
PKS2	220.2	230	ePnC	21:01:00.40			2.34
KWP	228.3	24	iPnD	21:00:56.80			-2.27
BZS	238.1	177	iPnD	21:00:58.90			-1.39
PKST	263.1	258	Pn	21:00:59.80			-3.60
PKSM	274.0	231	ePn	21:01:02.90			-1.86
GZR	281.6	159	iPnD	21:01:05.30			-0.41
BURB	283.4	93	iPnD	21:01:05.40			-0.53

87.  
 2008-10-16 time: 8:51:13.25 UTC ML= 1.0  
 lat: 48.101N lon: 20.216E h= 0.0 km  
 erh=13.3km erz= 6.9km  
 nr= 6 gap=205 rms=0.79  
 Locality: Bekölce  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PSZ	31.4	230	ePgC	8:51:18.70			-0.42
			eSg	51:24.50			0.79
KECS	47.0	25	ePg	8:51:21.80			-0.02
			eSg	51:29.20			0.70
VYHS	111.3	293	ePn	8:51:31.90			-1.01
			eSn	51:49.90			1.66

88.  
 2008-10-16 time: 20:33:11.13 UTC ML= 1.8  
 lat: 48.221N lon: 22.000E h= 0.0 km  
 erh= 1.4km erz= 1.9km  
 nr= 12 gap= 90 rms=0.31  
 Locality: Rétközberencs  
 Comments: explosion (300 kg)

sta	dist	azm	phase	hr	mn	sec	res
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TRPA	41.3	104	ePgC	20:33:18.60			0.09
KOLS	81.8	14	ePg	20:33:25.40			-0.33
			eSg	33:37.60			0.48
CRVS	85.6	332	ePg	20:33:26.50			0.09
			eSg	33:38.90			0.57
KECS	116.0	285	ePg	20:33:32.00			0.16
STHS	144.1	337	ePn	20:33:35.50			-0.64
PSZ	160.5	258	ePnC	20:33:38.40			0.23
			eSn	34:03.00			3.73
DRGR	167.7	161	Pn	20:33:38.96			-0.11
VYHS	236.4	277	ePn	20:33:47.40			-0.25
KOLL	269.4	278	ePn	20:33:51.90			0.15
BZS	291.0	186	Pn	20:33:55.40			0.96

89.  
 2008-10-18 time: 17:01:30.19 UTC ML= 1.1  
 lat: 45.919N lon: 18.652E h= 0.6 km  
 erh= 0.4km erz=17.7km  
 nr= 5 gap=265 rms=0.30  
 Locality: Sátórhely  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	31.2	264	ePgD	17:01:35.80			0.03
			eSg	01:39.50			-0.62
PKSM	32.5	359	ePgC	17:01:36.10			0.10
			eSg	01:39.90			-0.62
PKS9	79.6	339	eSg	17:01:55.80			0.31

90.  
 2008-10-18 time: 20:35:13.50 UTC ML= 2.0  
 lat: 45.928N lon: 20.217E h= 5.6 km  
 erh=14.0km erz= 8.7km  
 nr= 10 gap=282 rms=0.98  
 Locality: Serbia  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKS6	90.0	326	ePg	20:35:29.20			-0.41
			eSg	35:42.10			-0.07
PKSN	111.0	346	eSg	20:35:48.70			-0.13
PKSM	125.9	284	ePn	20:35:35.30			-0.22
			eSn	35:50.70			-2.00
RHK3	152.5	268	ePn	20:35:39.40			0.56
			eSn	35:58.00			-0.60
PKS9	166.4	296	ePn	20:35:43.90			3.33
			eSn	36:03.00			1.31
PKST	223.3	311	eSn	20:36:18.30			3.99

91.  
 2008-10-24 time: 8:30:09.61 UTC ML= 1.1  
 lat: 46.180N lon: 18.261E h= 0.2 km  
 erh= ---km erz= ---km  
 nr= 4 gap=180 rms=0.06  
 Locality: Mánfa  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSM	29.6	83	ePgD	8:30:14.90			0.02
			eSg	30:18.70			-0.30
RHK3	32.4	181	ePg	8:30:15.40			0.00
PKS9	45.2	2	ePg	8:30:17.70			0.01

92.  
 2008-11-03 time: 9:31:19.74 UTC ML= 1.4  
 lat: 48.365N lon: 19.832E h= 0.0 km  
 erh= 2.0km erz= 544km  
 nr= 6 gap=154 rms=0.32  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr	mn	sec	res
PSZ	49.9	175	ePgD	9:31:28.70			0.05
			eSg	31:35.60			0.00

## Földrengés paraméterek

KECS 50.1 75 ePg 9:31:28.20 -0.49  
 eSg 31:36.20 0.53  
 VYHS 75.1 281 ePg 9:31:33.40 0.26  
 eSg 31:43.40 -0.20

93.

2008-11-03 time: 9:37:47.02 UTC ML= 2.3  
 lat: 47.774N lon: 22.993E h= 5.5 km  
 erh= 2.8km erz= 2.6km  
 nr= 13 gap=119 rms=0.63  
 Locality: Romania  
 Comments:

sta	dist	azm	phase	hr mn sec	res
BMR	39.4	107	iPg	9:37:53.80	-0.33
TRPA	52.2	319	ePg	9:37:56.80	0.41
			eSg	38:03.00	-0.70
DRGR	111.3	191	iPgD	9:38:06.90	-0.02
KOLS	139.5	338	ePn	9:38:11.50	0.74
			eSn	38:27.20	-2.07
BURB	167.8	96	iPnD	9:38:14.70	0.41
CRVS	169.3	318	ePn	9:38:14.70	0.24
			eSn	38:37.30	1.43
KECS	202.7	293	ePn	9:38:18.50	-0.13
			eSn	38:44.80	1.52
STHS	223.7	325	eSn	9:38:46.20	-1.75
PSZ	232.5	274	iPn	9:38:21.60	-0.75

94.

2008-11-05 time: 8:53:04.77 UTC ML= 1.7  
 lat: 48.580N lon: 19.694E h= 0.0 km  
 erh= 6.6km erz= 693km  
 nr= 6 gap=259 rms=0.40  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
VYHS	64.1	261	ePg	8:53:16.10	-0.11
			eSg	53:25.00	-0.14
PSZ	75.1	169	ePgC	8:53:17.80	-0.38
			eSg	53:29.10	0.46
KOLL	95.3	270	ePg	8:53:22.40	0.61
			eSg	53:34.60	-0.47

95.

2008-11-09 time: 12:48:06.79 UTC ML= 0.9  
 lat: 45.910N lon: 18.671E h= 0.5 km  
 erh= 0.4km erz=24.8km  
 nr= 5 gap=270 rms=0.35  
 Locality: Udvar  
 Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	32.6	266	ePgC	12:48:12.70	0.09
			eSg	48:16.30	-0.85
PKSM	33.6	356	ePgC	12:48:12.90	0.10
			eSg	48:16.80	-0.68
PKS9	81.1	338	eSg	12:48:32.90	0.33

96.

2008-11-11 time: 5:56:21.57 UTC ML= 2.7  
 lat: 46.840N lon: 20.951E h= 10.0 km  
 erh= 3.3km erz= 3.6km  
 nr= 20 gap= 84 rms=0.86  
 Locality: Csárdaszállás  
 Comments:

sta	dist	azm	phase	hr mn sec	res
PKSN	82.9	274	ePg	5:56:36.40	-0.09
			eSg	56:47.90	-0.22
DRGR	134.4	92	iPn	5:56:44.30	0.21
PSZ	144.0	326	ePnC	5:56:45.30	0.02
			eSn	57:02.10	-1.68
BZS	145.4	159	iPnD	5:56:44.90	-0.55

## Hypocenter Parameters

BUD 162.7 296 ePn 5:56:46.70 -0.92  
 eSn 57:10.40 2.46  
 TRPA 186.8 40 iPn 5:56:50.90 0.28  
 PKSM 190.5 248 ePnC 5:56:51.30 0.21  
 eSn 57:13.40 -0.71  
 PKS9 206.3 262 ePn 5:56:55.20 2.15  
 eSn 57:15.20 -2.40  
 PKST 226.5 282 ePn 5:56:54.80 -0.77  
 eSn 57:27.80 5.71  
 CRVS 232.4 9 ePn 5:56:57.70 1.39  
 RHK3 233.1 243 ePn 5:56:58.20 1.80  
 eSn 57:24.90 1.34  
 VYHS 243.0 319 ePn 5:56:58.20 0.57  
 eSn 57:24.00 -1.75  
 LOT 267.1 125 iPn 5:56:59.90 -0.74  
 BEHE 322.3 263 eSn 5:57:52.80 9.45  
 BURB 334.3 75 iPnD 5:57:09.90 0.89  
 MORC 413.0 322 iPn 5:57:19.60 0.77

97.

2008-11-13 time: 7:47:30.14 UTC ML= 3.7  
 lat: 46.757N lon: 20.881E h= 16.1 km  
 erh= 2.9km erz=16.1km  
 nr= 16 gap= 95 rms=0.56  
 Locality: Kondoros  
 Comments: felt 4-5 EMS

sta	dist	azm	phase	hr mn sec	res
PKSN	78.9	281	eP*C	7:47:44.50	0.12
			eS*	47:56.50	1.02
PKS7	135.0	284	ePn	7:47:53.50	1.56
			eSn	48:10.90	1.96
BZS	138.9	156	iPn	7:47:52.50	0.07
DRGR	139.9	88	iPnD	7:47:52.50	-0.05
			eSn	48:09.70	-0.33
PSZ	149.1	330	ePnC	7:47:53.80	0.10
			eSn	48:14.60	2.52
BUD	162.4	300	ePnD	7:47:54.60	-0.77
			eSn	48:17.70	2.66
PKSM	182.3	251	iPnD	7:47:57.80	-0.04
TRPA	197.4	39	iPn	7:47:59.40	-0.33
PKS9	200.0	265	ePn	7:47:59.10	-0.95
			eSn	48:28.70	5.33
PKSG	201.9	290	ePn	7:47:58.90	-1.38
			eSn	48:29.70	5.91
BMR	222.8	63	iPnD	7:48:03.40	0.50
PKST	223.5	284	ePn	7:48:03.00	0.02
			eSn	48:35.80	7.20
RHK3	224.3	245	ePn	7:47:59.90	-3.17
			eSn	48:06.90	-21.86
CRVS	242.5	10	ePn	7:48:06.10	0.75
			eSn	48:42.40	9.59
VYHS	246.8	321	ePn	7:48:06.70	0.81
			eSn	48:32.70	-1.07
LOT	266.6	123	iPnD	7:48:08.60	0.25
KOLL	275.1	317	ePn	7:48:09.90	0.49
			eSn	48:38.20	-1.85
BEHE	316.1	264	ePnD	7:48:23.10	8.58
			eSn	49:02.70	13.56
SMOL	324.8	307	e n	7:48:23.60	7.99
			eSn	48:48.60	-2.47
ZST	326.7	299	ePn	7:48:16.30	0.45
			eSn	48:49.10	-2.39
SOP	343.2	287	ePn	7:48:17.10	-0.81
			eSn	48:52.90	-2.27
VOIR	354.2	114	iPn	7:48:20.20	0.92
CONA	401.0	289	Pn	7:48:25.30	0.19
			Sn	49:05.60	-2.38
ARSA	411.1	278	Pn	7:48:26.80	0.42
			Sn	49:08.10	-2.14
MLR	416.0	110	iPn	7:48:27.70	0.72
MORC	417.4	324	iPn	7:48:27.10	-0.05
VRAC	427.5	312	iPnD	7:48:28.50	0.09
BOJS	456.7	252	eSn	7:49:40.70	20.34
VRI	461.1	102	iPnD	7:48:33.70	1.09
MOA	514.8	284	Sn	7:49:30.20	-3.04
KBA	575.2	274	Pn	7:48:46.90	0.07
			Sn	49:44.50	-2.15

## Hypocenter Parameters

KHC 606.1 296 ePn 7:48:51.60 0.92  
 eSn 49:50.20 -3.31

98.

2008-11-13 time: 8:04:48.94 UTC ML= 1.6  
 lat: 46.733N lon: 21.086E h= 10.0 km  
 erh= ---km erz= ---km  
 nr= 3 gap=164 rms=0.00  
 Locality: Mezőmgyer  
 Comments:

sta	dist	azm	phase	hr mn sec	res
DRGR	124.3	87	iPnD	8:05:10.20	0.00
BZS	130.7	162	iPnD	8:05:11.00	0.00
PSZ	159.6	326	iPnD	8:05:14.60	0.00

99.

2008-11-13 time: 12:50:22.67 UTC ML= 3.5  
 lat: 46.754N lon: 20.869E h= 16.6 km  
 erh= 1.7km erz=10.0km  
 nr= 14 gap= 95 rms=0.30  
 Locality: Kondoros  
 Comments: felt 4-5 EMS

sta	dist	azm	phase	hr mn sec	res
PKSN	78.1	282	eP*C	12:50:36.90	0.16
			eS*	50:48.90	1.19
PKS7	134.2	284	ePnD	12:50:44.50	0.19
			eSn	51:03.10	1.91
BZS	139.0	155	iPnD	12:50:45.00	0.09
DRGR	140.8	88	iPnD	12:50:45.10	-0.03
PSZ	148.9	330	ePnC	12:50:46.20	0.05
			eSn	51:06.80	2.33
BUD	161.8	300	ePnC	12:50:47.80	0.04
			eSn	51:06.90	-0.43
PKSM	181.4	251	iPnD	12:50:50.10	-0.10
			eSn	51:15.20	3.53
TRPA	198.2	39	iPn	12:50:51.90	-0.39
			eSn	51:22.50	7.10
PKS9	199.1	265	ePnD	12:50:51.40	-1.00
			eSn	51:20.80	5.20
PKSG	201.2	291	ePnD	12:50:52.90	0.24
			eSn	51:21.90	5.84
PKST	222.8	285	ePn	12:50:55.30	-0.06
			eSn	51:13.40	-7.45
RHK3	223.3	244	ePn	12:50:57.70	2.27
CRVS	242.9	11	e n	12:50:58.50	0.63
			eSn	51:34.90	9.57
VYHS	246.5	322	ePn	12:50:59.10	0.78
KOLL	274.8	318	e n	12:51:01.20	-0.64
			eSn	51:30.70	-1.69
BEHE	315.2	264	ePnC	12:51:16.00	9.12
			eSn	51:55.90	14.54
ZST	326.1	299	ePn	12:51:08.70	0.46
			eSn	51:41.70	-2.08
SOP	342.5	288	ePnC	12:51:10.60	0.32
BURB	343.2	74	iPn	12:51:12.20	1.83
VOIR	354.9	114	iPn	12:51:12.70	0.87
CONA	400.3	289	Pn	12:51:17.70	0.21
			Sn	51:59.70	-0.54
MLR	416.7	110	iPnD	12:51:20.30	0.76
MORC	417.1	324	iPn	12:51:20.40	0.81
VRAC	427.0	312	iPnD	12:51:21.20	0.37
DPC	522.1	320	ePn	12:51:32.90	0.22
KHC	605.5	296	ePn	12:51:44.10	1.03
			eSn	52:42.60	-3.19

100.

2008-11-19 time: 10:31:45.56 UTC ML= 1.4  
 lat: 48.827N lon: 21.175E h= 0.0 km  
 erh= 2.7km erz= 475km  
 nr= 5 gap=165 rms=0.21  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
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## Földrengés paraméterek

CRVS	22.6	68	ePg	10:31:49.50	-0.10
KECS	63.5	233	ePg	10:31:57.10	0.20
			eSg	32:05.40	-0.35
STHS	65.8	4	ePg	10:31:57.50	0.20
			eSg	32:06.20	-0.27

101.

2008-11-20 time: 9:56:40.17 UTC ML= 2.4  
 lat: 48.405N lon: 19.803E h= 0.8 km  
 erh= 3.2km erz= 4.9km  
 nr= 10 gap=123 rms=0.80  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
KECS	51.2	80	ePg	9:56:49.30	-0.02
			eSg	56:55.60	-0.85
PSZ	54.6	173	ePgD	9:56:49.50	-0.42
			eSg	56:59.10	1.58
VYHS	72.2	278	ePg	9:56:52.80	-0.26
			eSg	57:03.20	0.08
KOLL	105.3	281	eSg	9:57:13.30	-0.35
CRVS	134.1	66	ePn	9:57:04.60	0.79
			eSn	57:21.10	-1.16
STHS	154.3	43	eSn	9:57:29.00	2.26

102.

2008-11-21 time: 15:52:04.46 UTC ML= 1.2  
 lat: 45.916N lon: 18.630E h= 0.5 km  
 erh= 0.8km erz=32.2km  
 nr= 6 gap=263 rms=0.47  
 Locality: Majs  
 Comments:

sta	dist	azm	phase	hr mn sec	res
RHK3	29.5	264	ePg	15:52:09.70	-0.02
			eSg	52:13.20	-0.62
PKSM	32.9	2	ePnC	15:52:10.30	-0.04
			eSg	52:14.00	-0.92
PKS9	79.4	340	ePg	15:52:19.30	0.67
			eSg	52:29.90	0.21

103.

2008-11-25 time: 14:33:48.24 UTC ML= 2.6  
 lat: 48.776N lon: 21.608E h= 0.4 km  
 erh= 4.5km erz= 7.2km  
 nr= 9 gap=163 rms=0.90  
 Locality: Slovakia  
 Comments:

sta	dist	azm	phase	hr mn sec	res
CRVS	17.7	323	ePg	14:33:50.60	-0.81
KOLS	51.9	70	ePg	14:33:57.20	-0.30
			eSg	34:04.50	-0.23
STHS	76.1	340	ePg	14:34:03.00	1.17
			eSg	34:11.20	-1.23
KECS	88.9	249	ePg	14:34:05.00	0.88
			eSg	34:15.00	-1.50
PSZ	158.8	233	ePnC	14:34:15.10	0.08
			eSn	34:37.30	1.39

104.

2008-12-01 time: 10:01:44.51 UTC ML= 1.5  
 lat: 48.382N lon: 19.841E h= 0.0 km  
 erh= 1.4km erz= 1.0km  
 nr= 6 gap=249 rms=0.22  
 Locality: Slovakia  
 Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	49.0	77	ePg	10:01:53.60	0.34
			eSg	02:00.10	0.01
PSZ	51.7	176	ePnC	10:01:53.80	0.05
			eSg	02:00.80	-0.15

## Földrengés paraméterek

## Hypocenter Parameters

CRVS 132.7 64 ePn 10:02:07.90 -0.19  
eSn 02:26.10 -0.38

105.

2008-12-02 time: 13:33:41.23 UTC ML= 2.2  
lat: 47.755N lon: 17.543E h= 12.9 km  
erh= 4.3km erz= 4.4km  
nr= 15 gap=107 rms=1.32  
Locality: Györladamér  
Comments:

sta	dist	azm	phase	hr mn sec	res
ZST	59.1	326	ePg	13:33:54.40	2.37
			eSg	34:00.60	0.14
PKST	66.4	146	ePg	13:33:53.80	0.49
			eSg	34:02.10	-0.63
SOP	74.3	264	ePgd	13:33:53.40	-1.31
			eSg	34:05.10	-0.12
PKSG	75.5	122	ePg	13:33:55.30	0.40
			eSg	34:05.40	-0.17
SMOL	84.8	354	eSg	13:34:07.90	-0.61
KOLL	111.7	35	ePn	13:34:01.20	0.66
			eSn	34:15.50	-0.11
BUD	115.3	105	eSn	13:34:13.00	-3.41
PKS9	141.3	157	ePn	13:34:06.50	2.26
			eSn	34:23.60	1.42
PSZ	177.0	84	ePnD	13:34:08.50	-0.18

106.

2008-12-03 time: 10:36:02.06 UTC ML= 2.0  
lat: 48.833N lon: 20.567E h= 0.0 km  
erh= 3.7km erz= 703km  
nr= 9 gap=191 rms=0.54  
Locality: Slovakia  
Comments: probably explosion

sta	dist	azm	phase	hr mn sec	res
KECS	39.4	189	ePg	10:36:09.10	0.01
			eSg	36:14.50	-0.08
CRVS	66.0	83	ePg	10:36:13.50	-0.35
			eSg	36:22.30	-0.75
STHS	81.5	37	ePg	10:36:16.40	-0.21
PSZ	113.3	206	ePgc	10:36:22.60	0.31
			eSg	36:37.50	-0.57
KOLS	125.6	85	ePg	10:36:26.20	1.71
			eSg	36:41.70	-0.28

107.

2008-12-07 time: 2:47:41.29 UTC ML= 4.0  
lat: 47.778N lon: 16.186E h= 6.7 km  
erh= 1.2km erz= 1.2km  
nr= 32 gap= 35 rms=0.41  
Locality: Austria  
Comments:

sta	dist	azm	phase	hr mn sec	res
CONA	29.5	305	Pg	2:47:46.70	0.02
			Sg	47:50.80	-0.09
SOP	29.8	111	ePgc	2:47:47.60	0.86
			eSg	47:51.60	0.60
ARSA	77.0	220	Pg	2:47:54.30	-0.79
			Sg	48:02.80	-3.06
ZST	82.7	56	ePg	2:47:55.90	-0.21
			eSg	48:07.00	-0.66
SMOL	123.5	48	ePn	2:48:02.80	-0.06
			eSn	48:19.30	-0.38
MOA	144.1	273	Pn	2:48:05.20	-0.23
			Sn	48:22.30	-1.95
KOGS	147.9	178	iPn	2:48:05.90	-0.01
			iSn	48:25.20	0.09
SOKA	150.3	216	Pn	2:48:05.90	-0.30
			Sn	48:23.40	-2.24
PERS	150.6	213	iPn	2:48:06.20	-0.04
			iSn	48:24.40	-1.31
PKST	150.7	113	ePnC	2:48:06.10	-0.15
			eSn	48:22.40	-3.32

BEHE 152.1 163 ePnC 2:48:07.00 0.57  
eSn 48:28.60 2.56

GROS 155.3 200 iPn 2:48:06.70 -0.13  
iSn 48:24.70 -2.06

PKSG 171.3 105 ePnD 2:48:08.60 -0.22  
eSn 48:27.50 -2.80

VRAC 172.8 10 iPnD 2:48:08.60 -0.41  
TREC 176.4 343 ePn 2:48:10.10 0.64

eSn 48:30.40 -1.04  
ePn 2:48:10.60 -0.22

OBKA 187.9 221 Pn 2:48:11.40 0.50  
Sn 48:35.20 1.21

BUD 215.8 99 ePnC 2:48:14.20 -0.17  
GERE 219.2 303 Pn 2:48:15.33 0.53

KBA 228.1 250 Pn 2:48:17.00 1.10  
Sn 48:41.50 -1.40

LJU 230.5 213 ePn 2:48:16.80 0.59  
eSn 48:47.60 4.16

MYKA 231.2 236 Pn 2:48:16.80 0.51  
Sn 48:41.90 -1.70

MORC 243.6 24 iPnD 2:48:18.00 0.16  
KHC 244.7 308 ePn 2:48:18.30 0.33

eSn 48:49.00 2.42  
PKSM 255.3 133 ePnC 2:48:18.90 -0.40

eSn 48:45.10 -3.84  
LIKS 258.3 57 ePn 2:48:22.00 2.33

eSn 48:51.00 1.39  
VOY 261.2 222 ePn 2:48:20.20 0.17

eSn 48:56.70 6.46  
RHK3 262.6 143 ePnC 2:48:20.10 -0.11

eSn 48:48.40 -2.16  
OKC 270.6 32 ePn 2:48:21.30 0.10

PSZ 278.0 87 iPn 2:48:22.00 -0.12  
PSZ 278.0 87 ePnC 2:48:22.10 -0.02

eSn 48:51.70 -2.28  
DPC 286.2 2 ePn 2:48:22.70 -0.45

eSn 49:01.00 5.19  
PKS6 287.6 117 ePnD 2:48:23.10 -0.22

eSn 48:52.60 -3.51  
PKSN 294.9 109 ePnC 2:48:22.10 -2.14

eSn 48:55.20 -2.54  
KECS 329.5 76 ePn 2:48:28.30 -0.25

eSn 49:04.10 -1.31  
WTTA 347.4 261 Pn 2:48:31.60 0.82

Sn 49:07.20 -2.19  
WATA 350.4 262 Pn 2:48:30.80 -0.36

RETA 408.9 265 Pn 2:48:39.40 0.95  
CRVS 410.6 72 ePn 2:48:38.90 0.24

eSn 49:22.70 -0.70  
STHS 415.2 64 ePn 2:48:40.30 1.07

eSn 49:23.40 -1.03  
FETA 420.5 258 Pn 2:48:41.10 1.21

Sn 49:24.40 -1.20  
GRFO 423.1 300 Pn 2:48:41.02 0.80

KOLS 469.1 74 ePn 2:48:46.20 0.25  
eSn 49:35.90 -0.49

TRPA 476.1 85 iPn 2:48:45.70 -1.13  
BZS 479.8 120 iPn 2:48:46.70 -0.59

108.

2008-12-15 time: 10:23:45.80 UTC ML= 1.3  
lat: 47.343N lon: 18.308E h= 4.9 km  
erh= 2.2km erz= 1.1km  
nr= 7 gap=132 rms=0.24  
Locality: Csákbéreny  
Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	8.3	49	ePgc	10:23:47.30	-0.21
			eSg	23:49.30	0.45
PKST	22.7	246	ePgc	10:23:49.70	-0.24
			eSg	23:53.30	0.12
PKSM	128.4	169	ePn	10:24:08.30	0.09
VYHS	133.9	17	ePn	10:24:09.20	0.30
			eSn	24:26.80	-0.12

## Hypocenter Parameters

## Földrengés paraméterek

109.

2008-12-15 time: 17:44:09.39 UTC ML= 2.5  
 lat: 45.820N lon: 17.918E h= 5.7 km  
 erh= 5.8km erz= 3.9km  
 nr= 13 gap=176 rms=0.64  
 Locality: Kemse  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
RHK3	27.1	74	ePgD	17:44:14.10			-0.23
			eSg	44:21.30			3.12
PKSM	71.0	52	eSg	17:44:34.30			2.28
PKSM	71.0	52	iPgD	17:44:22.00			-0.11
BEHE	114.1	309	ePg	17:44:30.30			0.51
			eSg	44:51.60			5.91
KOGS	146.6	298	iPn	17:44:33.10			-0.87
			iSn	44:59.20			6.05
PKST	160.2	3	ePn	17:44:35.80			0.13
			eSn	45:05.30			9.13
GCIS	178.0	272	iPn	17:44:37.70			-0.19
PKSG	178.4	12	ePn	17:44:38.30			0.35
			eSn	45:09.90			9.68
CRES	191.2	270	iPn	17:44:40.50			0.95
PKSN	192.0	51	ePn	17:44:41.20			1.56
			eSn	45:07.40			4.18
BUD	203.4	25	ePnD	17:44:46.60			5.54
			eSn	45:16.70			10.94
ARSA	243.0	311	Pn	17:44:45.90			-0.09
			Sn	45:17.30			2.76
PSZ	277.7	33	iPnD	17:44:48.30			-2.03
PSZ	277.7	33	eSn	17:45:36.00			13.74
CONA	282.0	326	Pn	17:44:51.40			0.54
			Sn	45:26.00			2.80
BZS	288.9	94	iPnD	17:44:51.30			-0.42
MOA	358.5	309	Pn	17:44:59.80			-0.60
			Sn	45:42.20			2.02
GZR	382.0	97	iPn	17:45:02.60			-0.73

110.

2008-12-18 time: 2:49:31.97 UTC ML= 1.7  
 lat: 47.285N lon: 18.415E h= 8.2 km  
 erh= 0.7km erz= 0.5km  
 nr= 11 gap=107 rms=0.13  
 Locality: Zámoly  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	12.0	351	ePgD	2:49:34.70			0.14
			eSg	49:36.30			-0.28
PKST	28.9	264	ePgC	2:49:37.40			0.06
			eSg	49:41.40			-0.13
BUD	51.0	64	ePg	2:49:41.10			-0.09
			eSg	49:48.50			0.11
PKSM	120.6	172	ePn	2:49:52.90			-0.10
			eSn	50:07.00			-2.39
PSZ	131.7	58	ePn	2:49:54.50			0.13
			eSn	50:11.80			-0.05
VYHS	138.0	13	ePn	2:49:55.00			-0.16
			eSn	50:13.20			-0.06

111.

2008-12-18 time: 9:48:50.65 UTC ML= 1.4  
 lat: 47.314N lon: 18.391E h= 9.0 km  
 erh= 1.5km erz= 0.8km  
 nr= 11 gap=103 rms=0.28  
 Locality: Zámoly  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	8.6	360	ePgD	9:48:53.00			0.12
			eSg	48:54.60			-0.01
PKST	27.7	257	ePgC	9:48:55.80			-0.05
			eSg	48:59.70			-0.20
BUD	51.3	68	eSg	9:49:07.00			-0.22
PKSM	124.0	171	ePn	9:49:12.00			0.00
			eSn	49:25.30			-3.35

PSZ	131.5	59	ePn	9:49:12.90			-0.03
			eSn	49:30.70			0.39
VYHS	135.3	14	ePn	9:49:13.90			0.49
			eSn	49:30.50			-0.66

112.

2008-12-18 time: 10:35:05.35 UTC ML= 1.0  
 lat: 47.320N lon: 18.374E h= 10.0 km  
 erh= 2.4km erz= 1.1km  
 nr= 7 gap=156 rms=0.24  
 Locality: Zámoly  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	8.1	9	ePgD	10:35:07.70			0.06
			eSg	35:09.30			-0.13
PKST	26.5	255	ePgD	10:35:10.40			-0.02
			eSg	35:14.40			0.03
PKSM	124.9	171	ePn	10:35:26.60			-0.08
			eSn	35:39.80			-3.52
VYHS	135.0	15	ePn	10:35:27.60			-0.35
			eSn	35:46.40			0.83

113.

2008-12-19 time: 3:40:51.22 UTC ML= 2.5  
 lat: 47.330N lon: 18.393E h= 8.5 km  
 erh= 1.9km erz= 1.4km  
 nr= 21 gap= 70 rms=0.56  
 Locality: Zámoly  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKST	28.3	254	ePgC	3:40:56.30			-0.19
			eSg	41:00.30			-0.31
BUD	50.5	70	ePgC	3:41:01.00			0.63
			eSg	41:06.20			-1.30
PKSN	121.8	113	ePn	3:41:13.00			0.65
			eSn	41:29.00			0.16
PKSM	125.8	171	ePnD	3:41:12.70			-0.15
			eSn	41:25.80			-3.93
PSZ	130.4	60	ePnD	3:41:13.50			0.07
			eSn	41:30.20			-0.55
VYHS	133.6	14	ePn	3:41:13.90			0.08
			eSn	41:29.90			-1.55
SOP	143.7	286	ePn	3:41:15.40			0.31
			eSn	41:34.60			0.89
RHK3	160.6	184	ePn	3:41:17.10			-0.10
			eSn	41:33.60			-3.86
CONA	201.5	289	Pn	3:41:22.20			-0.10
KECS	202.2	51	ePn	3:41:22.10			-0.29
			eSn	41:46.40			-0.30
ARSA	217.3	268	Pn	3:41:24.00			-0.27
VRAC	257.3	329	iPnD	3:41:30.50			1.25
BZS	312.4	128	iPnD	3:41:35.60			-0.52
DRGR	333.4	100	iPnD	3:41:39.00			0.25
GZR	400.2	123	iPnD	3:41:46.80			-0.27

114.

2008-12-19 time: 18:07:20.47 UTC ML= 0.6  
 lat: 47.419N lon: 18.290E h= 19.9 km  
 erh=13.5km erz= 4.1km  
 nr= 6 gap=244 rms=0.58  
 Locality: Pusztavám  
 Comments:

sta	dist	azm	phase	hr	mn	sec	res
PKSG	8.2	111	ePgD	18:07:24.90			0.59
			eSg	07:26.50			-0.80
PKST	26.2	227	ePgD	18:07:25.80			-0.55
			eSg	07:31.60			0.67
PKSM	136.8	169	ePn	18:07:42.20			0.17
			eSn	07:58.60			-0.24



## Földrengés paraméterek

115.

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2008-12-20 time: 16:38:26.91 UTC ML= 1.4  
lat: 48.021N lon: 20.344E h= 8.7 km  
erh= 3.4km erz= 1.7km  
nr= 8 gap=211 rms=0.36  
Locality: Mónosbél  
Comments:

sta	dist	azm	phase	hr mn sec	res
PSZ	35.5	251	ePg	16:38:33.20	-0.23
			eSg	38:38.50	-0.02
KECS	52.5	12	ePg	16:38:36.30	-0.11
			eSg	38:43.90	0.08
VYHS	123.8	295	ePn	16:38:48.90	0.64
			eSn	39:04.40	-0.51
CRVS	128.2	40	ePn	16:38:49.10	0.29

## Hypocenter Parameters

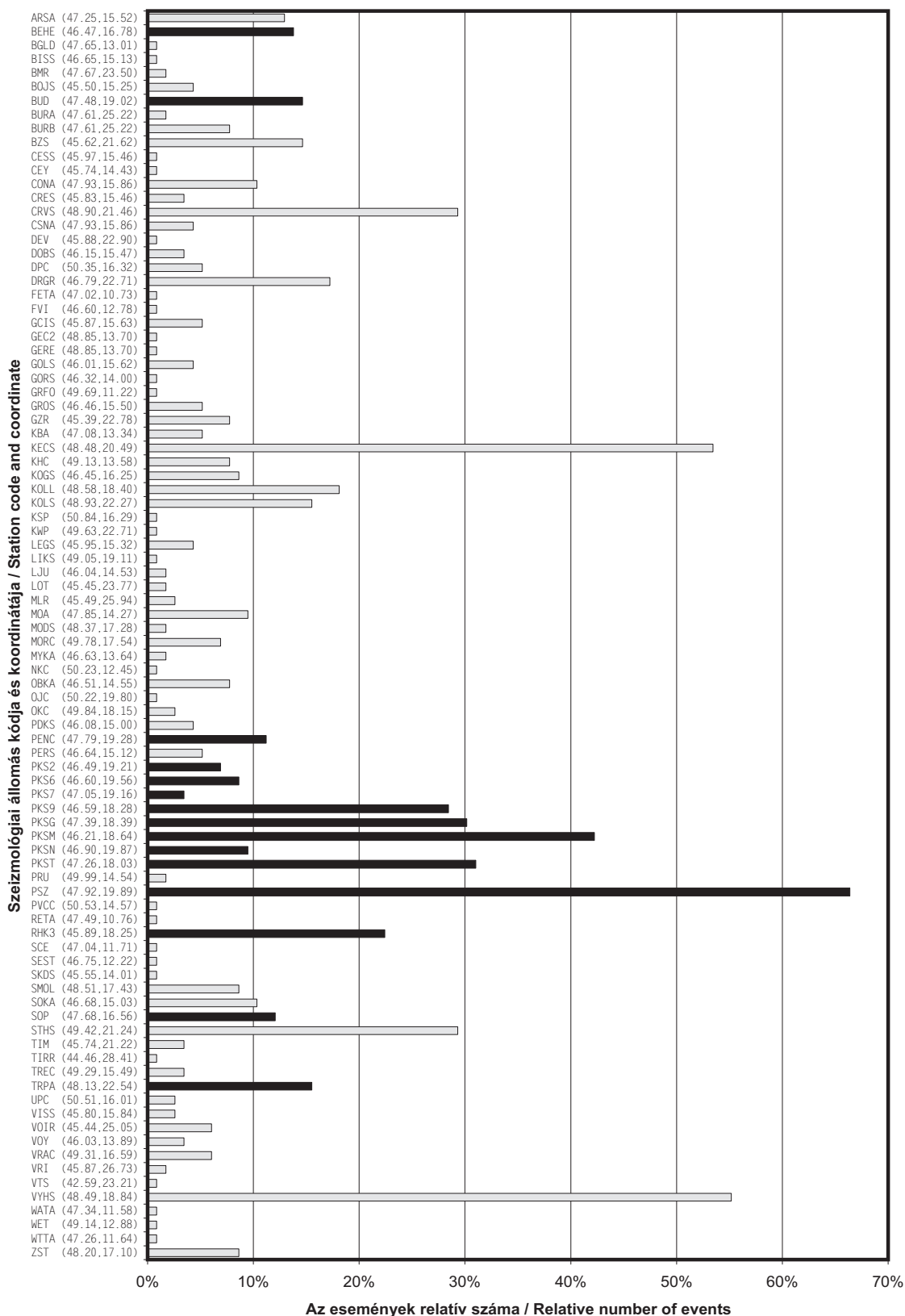
eSn 39:05.30 -0.59

116.

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2008-12-22 time: 23:05:17.68 UTC ML= 0.1  
lat: 47.285N lon: 18.409E h= 10.0 km  
erh= ---km erz= ---km  
nr= 4 gap=178 rms=0.18  
Locality: Zámoly  
Comments:

sta	dist	azm	phase	hr mn sec	res
PKSG	12.0	353	ePgC	23:05:20.60	0.13
			eSg	05:22.20	-0.45
PKST	28.5	264	eSg	23:05:27.40	0.12
PKSM	120.6	172	eSn	23:05:54.60	-0.09



3.4. ábra Az egyes állomások részvétele a hipocentrum meghatározásban  
 Figure 3.4. Contribution of individual stations to the hypocenter determination



## 4.

### JELENTŐS FÖLDRENGÉSEK 2008-BAN (Magyarországon érezhető földrengések)

2008. január 18.	- Pápasalamon
2008. június 25.	- Vámospércs
2008. július 15.	- Vámospércs
2008. november 13.	- Kondoros
2008. november 13.	- Kondoros

#### **A MAKROSZEIZMIKUS INTENZITÁS MEGHATÁROZÁSA**

A földrengés érezhető és épített környezetben okozott hatásainak felmérése kérdőívek segítségével történt. Az összegyűjtött válaszok alapján került meghatározásra az intenzitás értéke (Zsíros et al, 1990 és Zsíros, 1994).

Az intenzitás leírása az *Európai Makroszeizmikus Skála (EMS)* szerint történik, mely részletesen megtalálható Grünthal (1998) munkájában. (A *Melléklet*)

## 4.

### SIGNIFICANT EARTHQUAKES IN 2008 (Earthquakes that were felt in Hungary)

18 January 2008	- Pápasalamon
25 June 2008	- Vámospércs
15 July 2008	- Vámospércs
13 November 2008	- Kondoros
13 November 2008	- Kondoros

#### **METHOD USED FOR ESTIMATION OF INTENSITY**

The earthquake effects (macroseismic observations) were evaluated by questionnaires. Based on these reports the intensity values were estimated by a computer algorithm (Zsíros et al, 1990 and Zsíros, 1994).

The assigned intensities correspond to the *European Macroseismic Scale 1998 (EMS)* edited by Grünthal (1998). (APPENDIX A)

**2008. január 18. - Pápasalamon / 18 January 2008 - Pápasalamon****FÉSZKEPARAMÉTEREK / HYPOCENTER PARAMETERS**

Dátum / Date:	2008/01/18
Kipattanási idő / Origin Time:	08:14:37.8 UTC
Szélesség és hosszúság / Latitude and Longitude:	47.216 N 17.434 E (S.D. 2.2 km)
Mélység / Depth:	11.9 km (S.D. 2.3 km)
Magnitúdó / Magnitude:	2.7 ML
Maximális intenzitás / Maximum Intensity:	4 EMS

**LEÍRÁS**

Január 18-án reggel 2.7  $M_L$  magnitúdójú földrengés keltett riadalmat Veszprém-megyében, Pápa közelében. A rengés intenzitása 4 EMS fokra becsülhető (Pápasalamon). A rengés csak viszonylag kis területen (100-150 km<sup>2</sup>) volt érezhető.

Az esemény szeizmogramja a 4.1. ábrán látható.

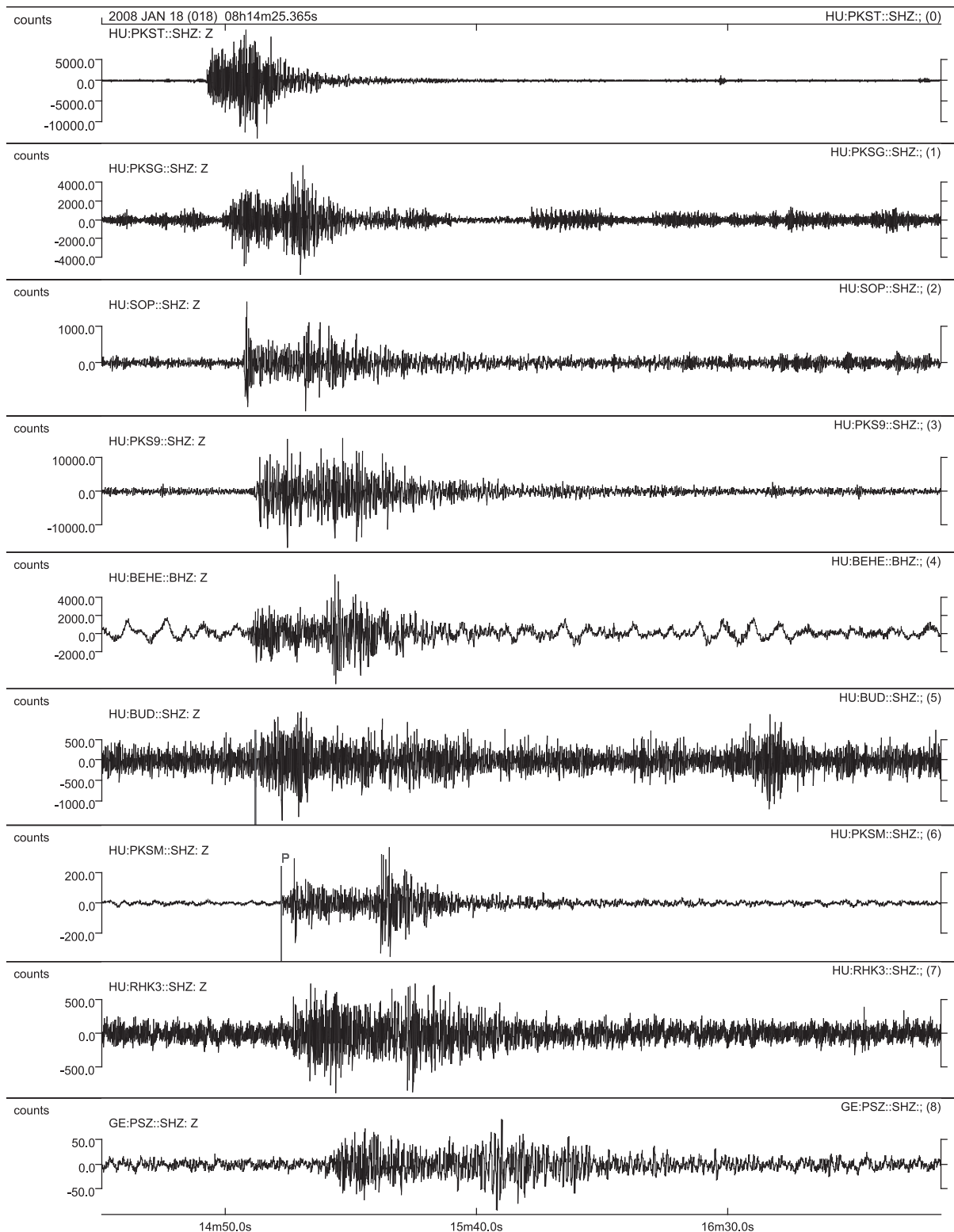
A rengés intenzitás eloszlását a 4.1. táblázat tartalmazza és a 4.2. ábra mutatja.

**DISCUSSION**

On January 18<sup>th</sup> morning, a 2.7  $M_L$  magnitude earthquake alarmed people in Veszprém County near Pápa. The shock was felt in a relatively small area of 100-150 km<sup>2</sup> and produced reports of 4 EMS from Pápasalamon.

Seismograms of the event are shown in Figure 4.1.

The intensity distribution of the event is shown in Table 4.1 and Figure 4.2.



4.1. ábra A 2008. január 18-i, pápasalamoni földrengés (08:14 UTC) szeizmogramjai

Figure 4.1. Seismograms of the Pápasalamon earthquake 18<sup>th</sup> January 2008 (08:14 UTC)

**4.1. Táblázat**

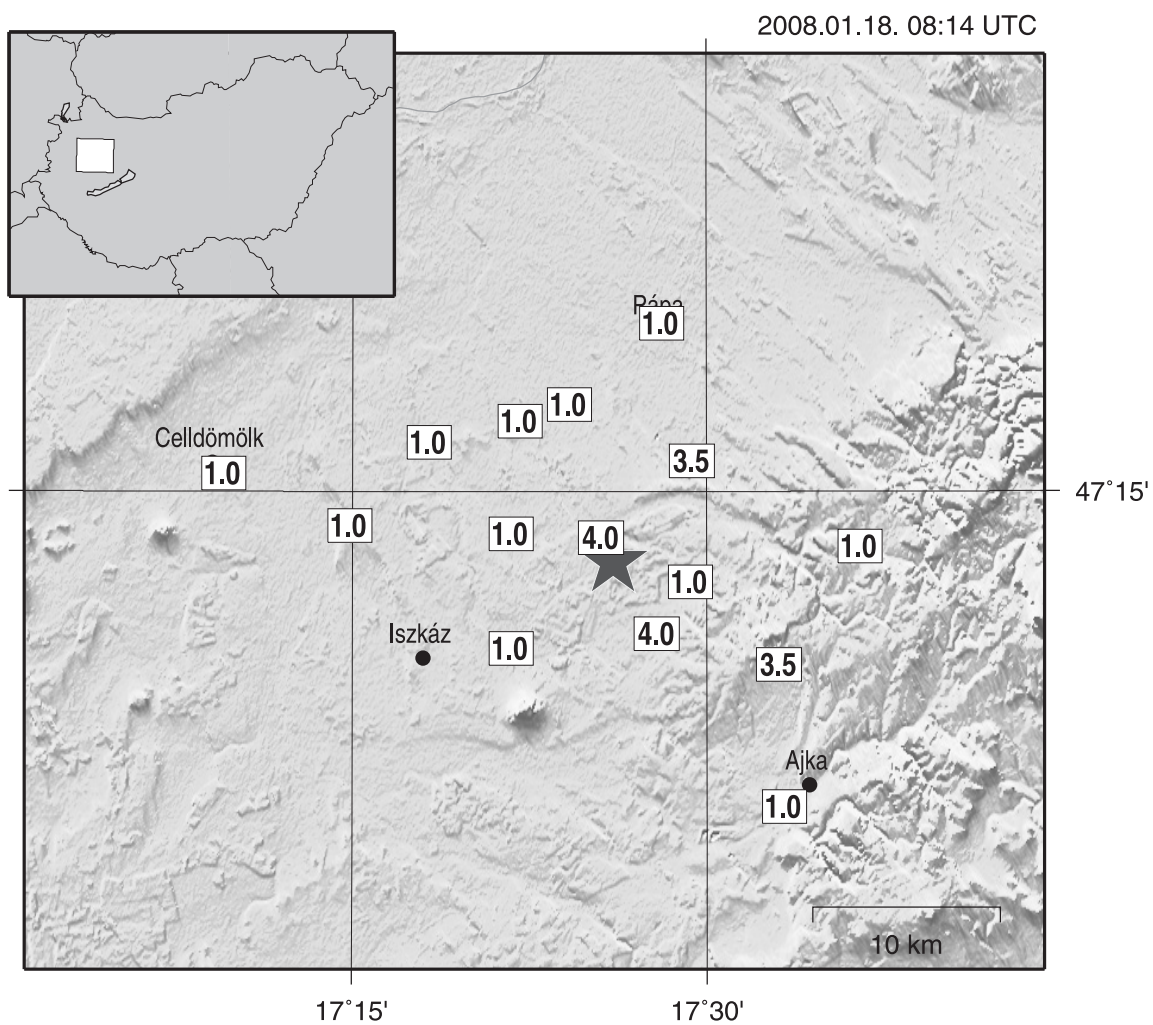
A 2008. január 18-i, pápasalamoni földrengés (08:14 UTC) intenzitás eloszlása

**Table 4.1.**

Intensity distribution of the Pápasalamon earthquake 18<sup>th</sup> January 2008 (08:14 UTC)

Helység / Location		Koordináta Coordinates		I Intenzitás Intensity	R Rel. megbízhatóság Rel. reliability	N Jelentések száma No. of reports
		Szélesség Latitude (N)	Hosszúság Longitude (E)			
1	Ajka	47.099	17.553	1.0	0%	2
2	Bakonyjákó	47.224	17.607	1.0	0%	1
3	Bakonypölöske	47.207	17.487	1.0	0%	1
4	Celldömök	47.259	17.158	1.0	0%	1
5	Egeralja	47.234	17.247	1.0	0%	1
6	Magyarpolány	47.167	17.550	3.5	39%	1
7	Nagyalásony	47.230	17.361	1.0	0%	1
8	Nemesszalók	47.274	17.303	1.0	0%	1
9	Noszlop	47.182	17.464	4.0	48%	1
10	Nyárád	47.284	17.367	1.0	0%	2
11	Pápa	47.331	17.467	1.0	0%	2
12	Pápaderecske	47.292	17.402	1.0	0%	1
13	Pápakovácsi	47.265	17.489	3.5	38%	1
14	Pápasalamon	47.228	17.425	4.0	50%	1
15	Somlószlós	47.175	17.361	1.0	0%	1





**4.2. ábra** A 2008. január 18-i, pápasalamoni földrengés (08:14 UTC) intenzitás eloszlása (a csillag a műszeresen meghatározott epicentrumot jelöli)

**Figure 4.2.** Intensity distribution of the Pápasalamon earthquake 18<sup>th</sup> January 2008 (08:14 UTC) (star - instrumental epicentre)

**2008. június 25. - Vámospércs / 25 June 2008 - Vámospércs****FÉSZKEPARAMÉTEREK / HYPOCENTER PARAMETERS**

Dátum / Date:	2008/06/25
Kipattanási idő / Origin Time:	01:22:55.9 UTC
Szélesség és hosszúság / Latitude and Longitude:	47.557 N 21.939 E (S.D. 4.0 km)
Mélység / Depth:	11.3 km (S.D. 4.9 km)
Magnitúdó / Magnitude:	2.5 ML
Maximális intenzitás / Maximum Intensity:	4-5 EMS

**LEÍRÁS**

Június 25-én éjjel kisebb, 2.5  $M_L$  magnitúdójú földrengést éreztek Hajdú-Bihar-megyében. A rengés intenzitása 4-5 EMS fokra becsülhető, de csak Vámospércs településen érezték.

Az esemény szeizmogramja a 4.3. ábrán látható.

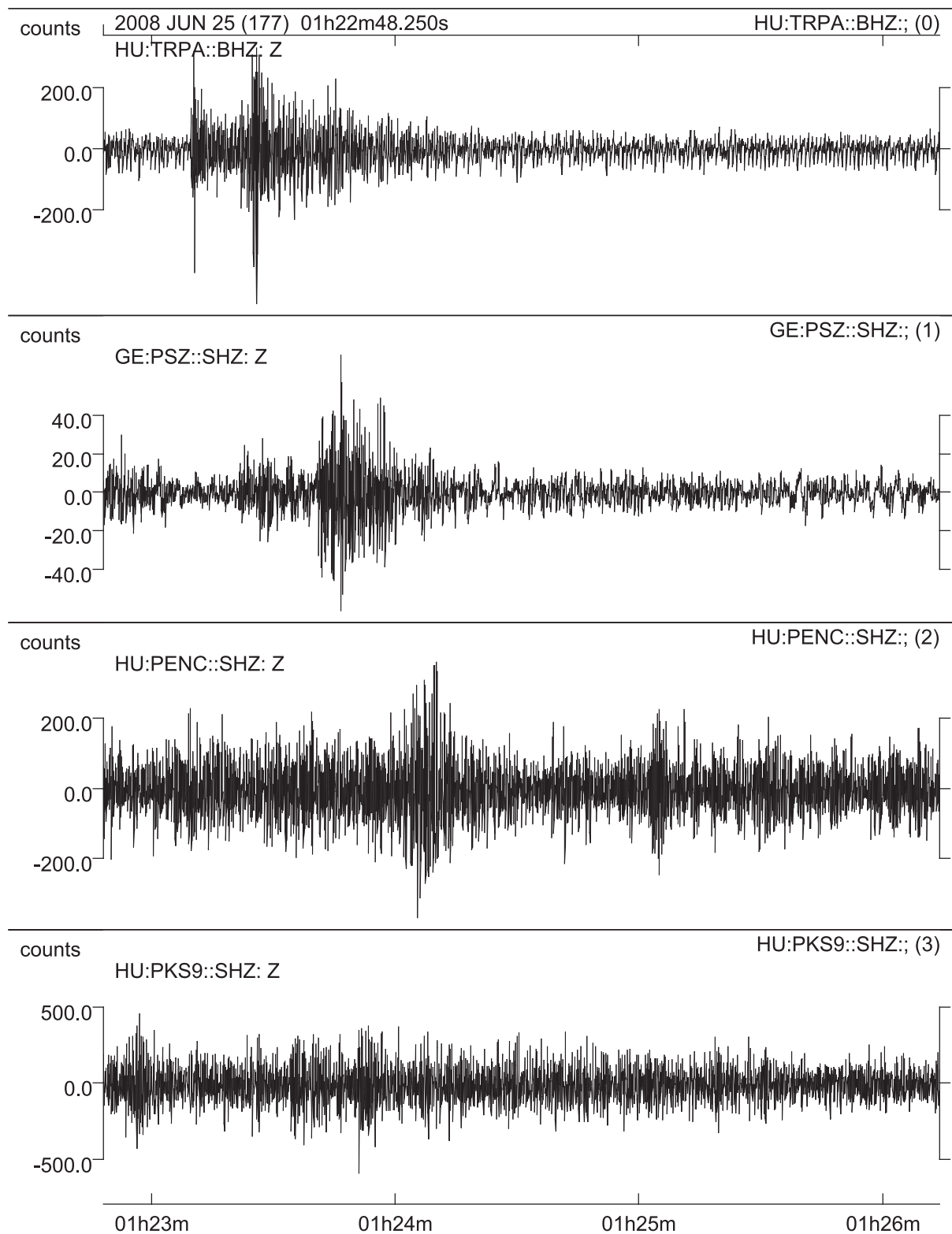
A rengés intenzitás eloszlását a 4.2. táblázat tartalmazza és a 4.4. ábra mutatja.

**DISCUSSION**

On June 25<sup>th</sup> night, a small magnitude earthquake (2.5  $M_L$ ) was reported from Vámospércs, Hajdú-Bihar County, E Hungary. The shock was felt (EMS 4-5) only at the epicenter area.

Seismograms of the event are shown in Figure 4.3.

The intensity distribution of the event is shown in Table 4.2 and Figure 4.4.



4.3. ábra A 2008. június 25-i, vámospércsi földrengés (01:23 UTC) szeizmogramjai

Figure 4.3. Seismograms of the Vámospércs earthquake 25<sup>th</sup> June 2008 (01:23 UTC)

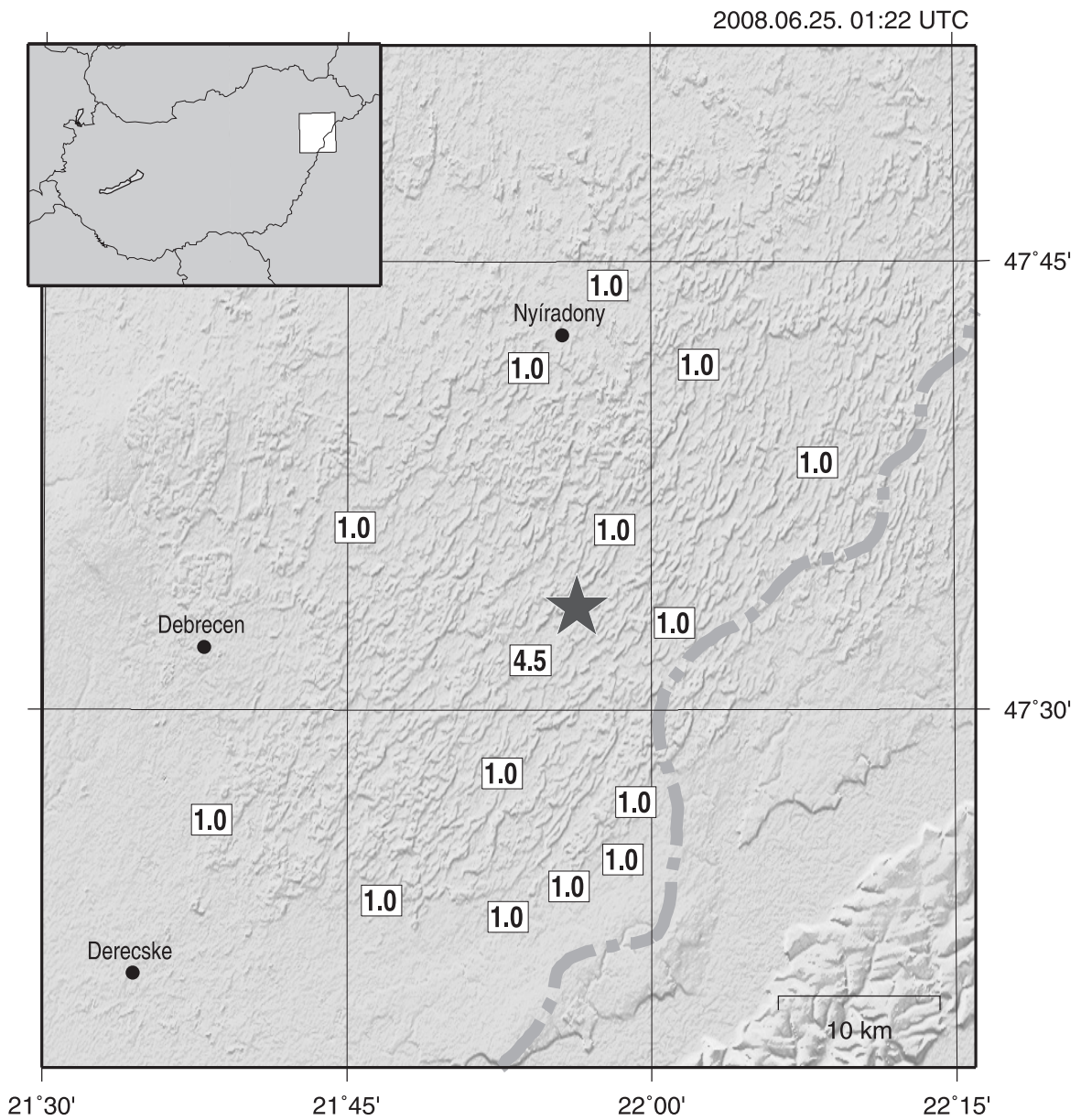
**4.2. Táblázat**

A 2008. június 25-i, vámospércsi földrengés (01:23 UTC) intenzitás eloszlása

**Table 4.2.**

Intensity distribution of the Vámospércs earthquake 25<sup>th</sup> June 2008 (01:23 UTC)

Helység / Location		Koordináta Coordinates		I Intenzitás Intensity	R Rel. megbízhatóság Rel. reliability	N Jelentések száma No. of reports
		Szélesség Latitude (N)	Hosszúság Longitude (E)			
1	Álmosd	47.417	21.975	1.0	0%	1
2	Bagamér	47.449	21.986	1.0	0%	1
3	Hajdúsámson	47.602	21.755	1.0	0%	1
4	Kokad	47.402	21.931	1.0	0%	1
5	Létavértes	47.385	21.881	1.0	0%	2
6	Mikepércs	47.439	21.637	1.0	0%	1
7	Monostorpályi	47.394	21.777	1.0	0%	1
8	Nyíracsád	47.601	21.969	1.0	0%	1
9	Nyíradony	47.691	21.898	1.0	0%	1
10	Nyírábrány	47.549	22.018	1.0	0%	1
11	Nyírlugos	47.693	22.038	1.0	0%	2
12	Nyírmihálydi	47.737	21.963	1.0	0%	1
13	Penészlek	47.638	22.136	1.0	0%	1
14	Újléta	47.465	21.876	1.0	0%	2
15	Vámospércs	47.528	21.900	4.5	32%	3



**4.4. ábra** A 2008. június 25-i, vámospércsi földrengés (01:23 UTC) intenzitás eloszlása (a csillag a műszeresen meghatározott epicentrumot jelöli)

**Figure 4.4.** Intensity distribution of the Vámospércs earthquake 25<sup>th</sup> June 2008 (01:23 UTC) (star - instrumental epicentre)

**2008. július 15. - Vámospércs / 15 July 2008 - Vámospércs****FÉSZKEPARAMÉTEREK / HYPOCENTER PARAMETERS**

Dátum / Date:	2008/07/15
Kipattanási idő / Origin Time:	19:59:06.0 UTC
Szélesség és hosszúság / Latitude and Longitude:	47.516 N 21.880 E (S.D. 5.9 km)
Mélység / Depth:	7.4 km (S.D. 7.5 km)
Magnitúdó / Magnitude:	1.9 M <sub>L</sub>
Maximális intenzitás / Maximum Intensity:	4-5 EMS

**LEÍRÁS**

Július 15-én este, három héttel az előző rengés után, újabb kisebb rengést (1.9 M<sub>L</sub>) érezték és jelentettek Vámospércs környékéről. A rengés legnagyobb becsült intenzitása most is 4-5 EMS volt.

Az esemény szeizmogramja a 4.5. ábrán látható.

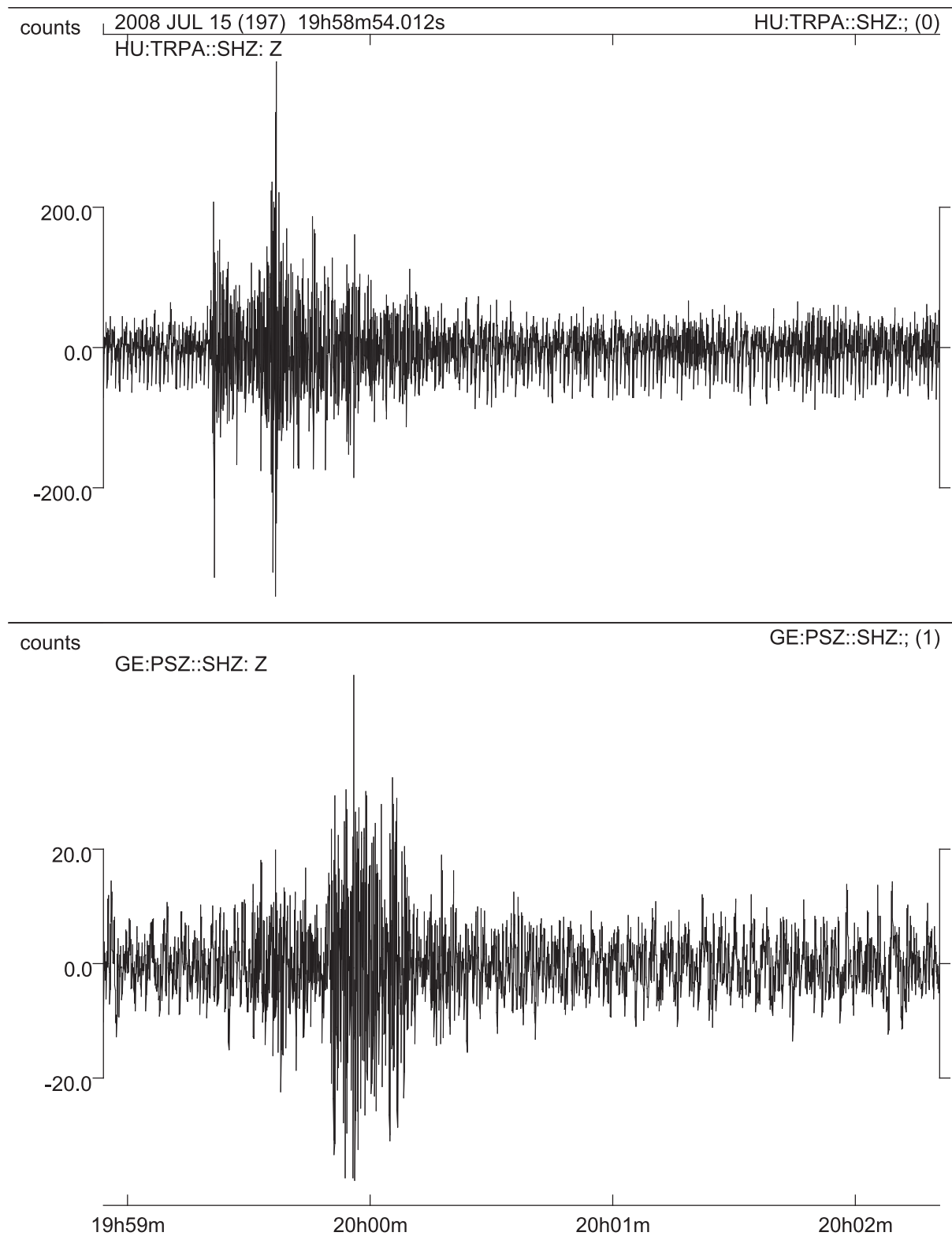
A rengés intenzitás eloszlását a 4.3. táblázat tartalmazza és a 4.6. ábra mutatja.

**DISCUSSION**

On July 15<sup>th</sup>, some three weeks after the previous earthquake, another small aftershock (1.9 M<sub>L</sub>) was reported (4-5 EMS) from Vámospércs area.

Seismograms of the event are shown in Figure 4.5.

The intensity distribution of the event is shown in Table 4.3 and Figure 4.6.



4.5. ábra A 2008. július 15-i, vámspércsi földrengés (19:59 UTC) szeizmogramjai

Figure 4.5. Seismograms of the Vámspércs earthquake 15<sup>th</sup> July 2008 (19:59 UTC)

**4.3. Táblázat**

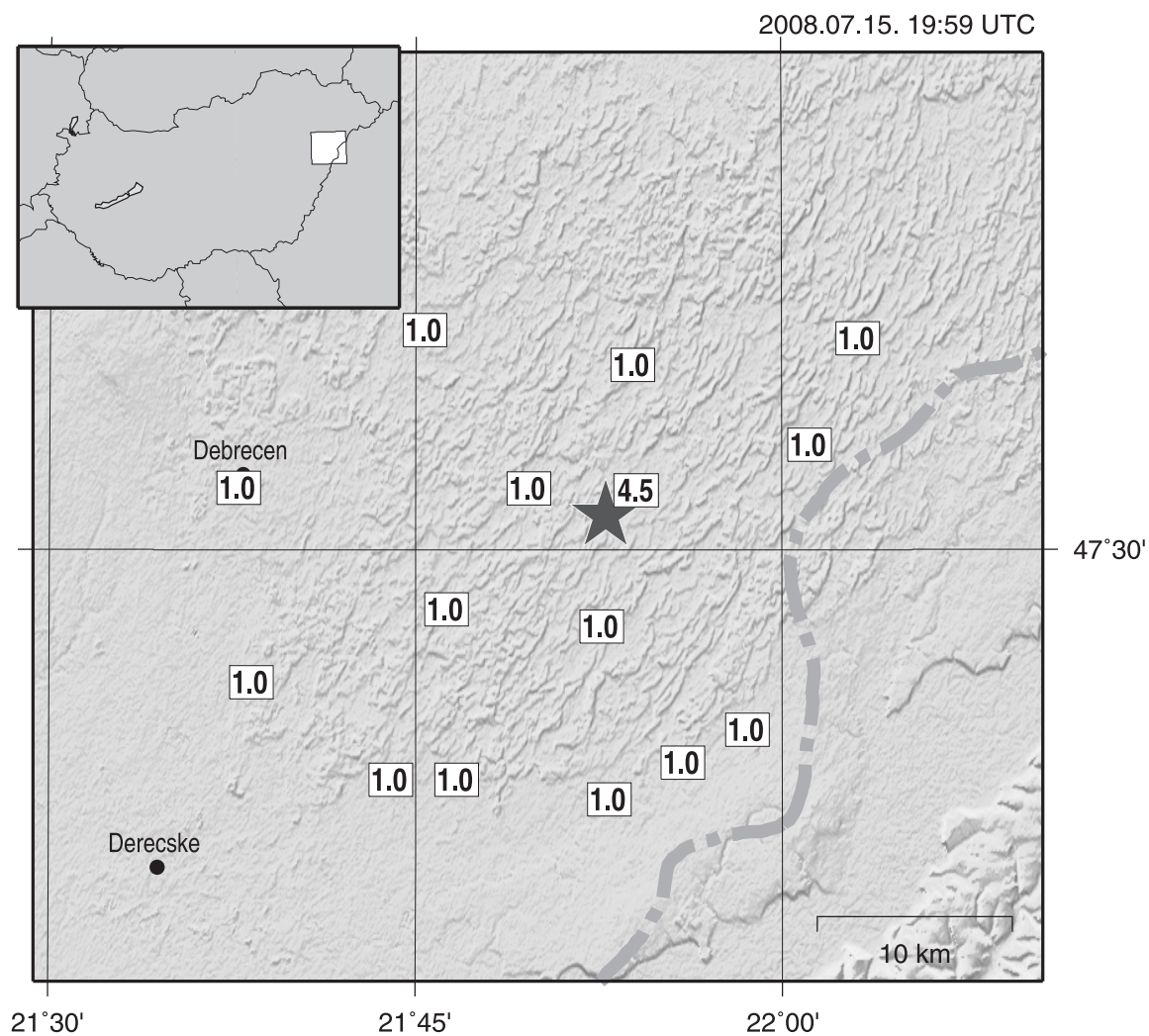
A 2008. július 15-i, vámospércsi földrengés (19:59 UTC) intenzitás eloszlása

**Table 4.3.**

Intensity distribution of the Vámospércs earthquake 15<sup>th</sup> July 2008 (19:59 UTC)

Helység / Location		Koordináta Coordinates		I Intenzitás Intensity	R Rel. megbízhatóság Rel. reliability	N Jelentések száma No. of reports
		Szélesség Latitude (N)	Hosszúság Longitude (E)			
1	Álmosd	47.417	21.975	1.0	0%	1
2	Bánk	47.473	21.770	1.0	0%	2
3	Debrecen	47.529	21.628	1.0	0%	1
4	Fülöp	47.598	22.051	1.0	0%	2
5	Hajdúsámson	47.602	21.755	1.0	0%	1
6	Haláp	47.529	21.826	1.0	0%	1
7	Hosszúpályi	47.394	21.732	1.0	0%	1
8	Kokad	47.402	21.931	1.0	0%	1
9	Létavértes	47.385	21.881	1.0	0%	2
10	Mikepércs	47.439	21.637	1.0	0%	1
11	Monostorpályi	47.394	21.777	1.0	0%	2
12	Nyírábrány	47.549	22.018	1.0	0%	2
13	Nyírmártonfalva	47.586	21.897	1.0	0%	2
14	Újléta	47.465	21.876	1.0	0%	1
15	Vámospércs	47.528	21.900	4.5	31%	1





4.6. ábra A 2008. július 15-i, vámospércsi földrengés (19:59 UTC) intenzitás eloszlása (a csillag a műszeresen meghatározott epicentrumot jelöli)

Figure 4.6. Intensity distribution of the Vámospércs earthquake 15<sup>th</sup> July 2008 (19:59 UTC) (star - instrumental epicentre)

**2008. november 13. - Kondoros / 13 November 2008 - Kondoros****FÉSZKEPARAMÉTEREK / HYPOCENTER PARAMETERS**

Dátum / Date:	2008/11/13
Kipattanási idő / Origin Time:	07:47:30.1 UTC
Szélesség és hosszúság / Latitude and Longitude:	46.757 N 20.881 E (S.D. 2.9 km)
Mélység / Depth:	16.1 km (S.D. 16.1 km)
Magnitúdó / Magnitude:	3.7 ML
Maximális intenzitás / Maximum Intensity:	4-5 EMS

**LEÍRÁS**

Az év legerősebb magyarországi rengése november 13-án pattant ki Békés megyében. A 3.7  $M_L$  magnitúdójú rengés csak kis területen volt érezhető. A legnagyobb megrázottságot (4-5 EMS) Kondoros településről jelentették.

Az esemény szeizmogramja a 4.7. ábrán látható.

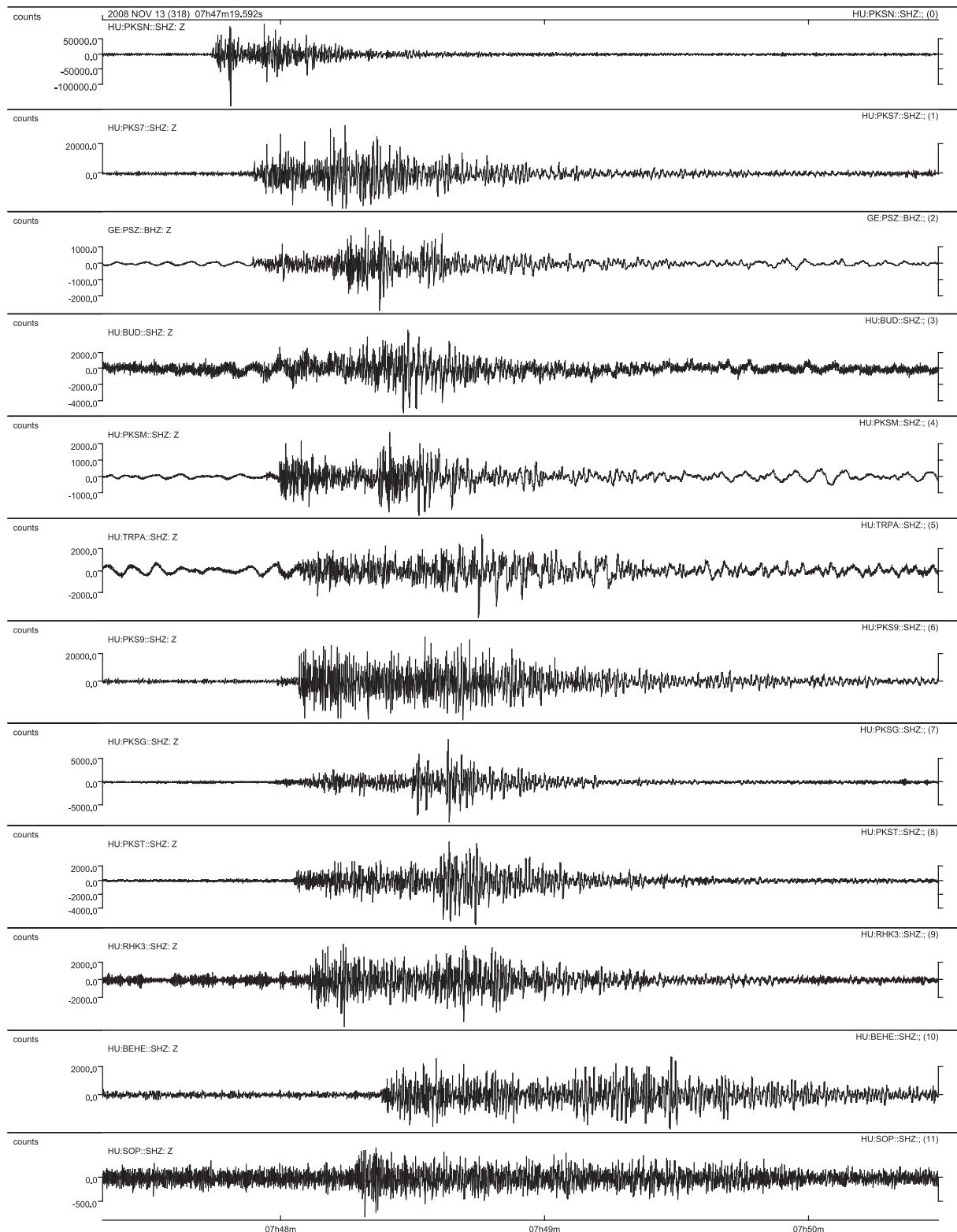
A rengés intenzitás eloszlását a 4.4. táblázat tartalmazza és a 4.8. ábra mutatja.

**DISCUSSION**

The highest magnitude (3.7  $M_L$ ) earthquake of the year was reported from Békés County on November 13<sup>th</sup>. The earthquake was felt only on a very small area. The highest intensity value (4-5 EMS) was reported from Kondoros.

Seismograms of the event are shown in Figure 4.7.

The intensity distribution of the event is shown in Table 4.4 and Figure 4.8.



4.7. ábra A 2008. november 13-i, kondorosi földrengés (07:47 UTC) szeizmogramjai

Figure 4.7. Seismograms of the Kondoros earthquake 13<sup>th</sup> November 2008 (07:47 UTC)

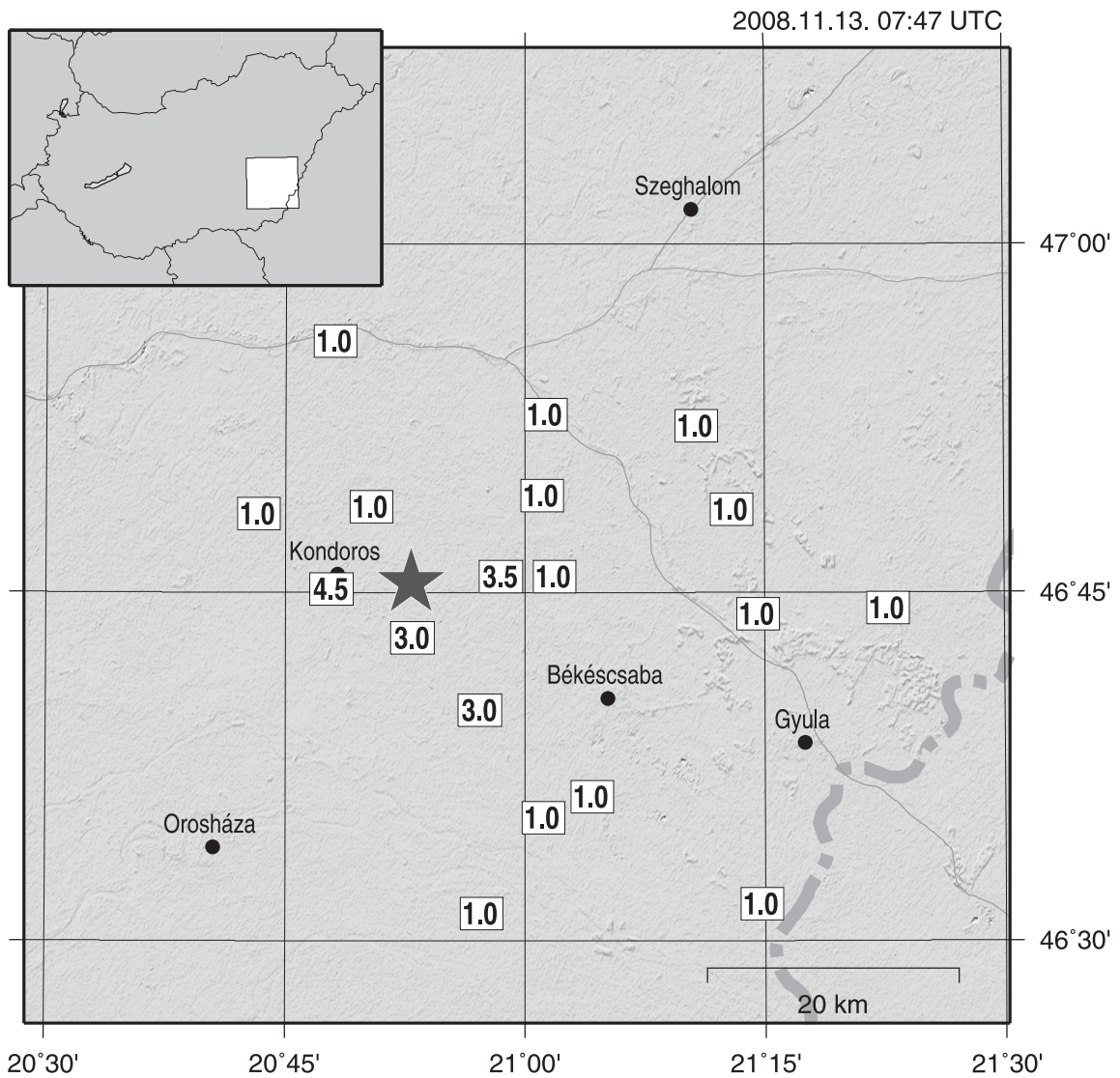
**4.4. Táblázat**

A 2008. november 13-i, kondorosi földrengés (07:47 UTC) intenzitás eloszlása

**Table 4.3.**

Intensity distribution of the Kondoros earthquake 13<sup>th</sup> November 2008 (07:47 UTC)

Helység / Location		Koordináta Coordinates		I Intenzitás Intensity	R Rel. megbízhatóság Rel. reliability	N Jelentések száma No. of reports
		Szélesség Latitude (N)	Hosszúság Longitude (E)			
1	Bélmegyer	46.870	21.177	1.0	0%	1
2	Doboz	46.735	21.241	1.0	0%	2
3	Elek	46.527	21.245	1.0	0%	1
4	Gyomaendrőd	46.931	20.800	1.0	0%	1
5	Hunya	46.812	20.838	1.0	0%	1
6	Kardos	46.807	20.720	1.0	0%	1
7	Kamut	46.762	20.974	3.5	35%	1
8	Kétsoprony	46.718	20.882	3.0	40%	1
9	Kondoros	46.753	20.797	4.5	31%	1
10	Köröstarcsa	46.878	21.020	1.0	0%	2
11	Medgyesbodzás	46.520	20.953	1.0	0%	2
12	Mezőberény	46.820	21.016	1.0	0%	2
13	Mezőtúr	47.007	20.623	1.0	0%	2
14	Murony	46.762	21.029	1.0	0%	2
15	Sarkad	46.739	21.377	1.0	0%	1
16	Szabadkígyós	46.604	21.068	1.0	0%	1
17	Tarhos	46.810	21.214	1.0	0%	1
18	Telekgerendás	46.666	20.952	3.0	30%	1
19	Újkígyós	46.589	21.017	1.0	0%	2



**4.8. ábra** A 2008. november 13-i, kondorosi földrengés (07:47 UTC) intenzitás eloszlása (a csillag a műszeresen meghatározott epicentrumot jelöli)

**Figure 4.8.** Intensity distribution of the Kondoros earthquake 13<sup>th</sup> November 2008 (07:47 UTC) (star - instrumental epicentre)

**2008. november 13. - Kondoros / 13 November 2008 - Kondoros****FÉSZKEPARAMÉTEREK / HYPOCENTER PARAMETERS**

Dátum / Date:	2008/11/13
Kipattanási idő / Origin Time:	12:50:22.7 UTC
Szélesség és hosszúság / Latitude and Longitude:	46.754 N 20.869 E (S.D. 1.7 km)
Mélység / Depth:	16.6 km (S.D. 10.0 km)
Magnitúdó / Magnitude:	3.5 ML
Maximális intenzitás / Maximum Intensity:	4-5 EMS

**LEÍRÁS**

Néhány órával az előző rengés után, egy valamivel kisebb utórengés (3.5  $M_L$ ) követte a november 13-án, Kondoros környékén keletkezett földrengést. A rengés legnagyobb becsült intenzitása 4-5 EMS volt.

Az esemény szeizmogramja a 4.9. ábrán látható.

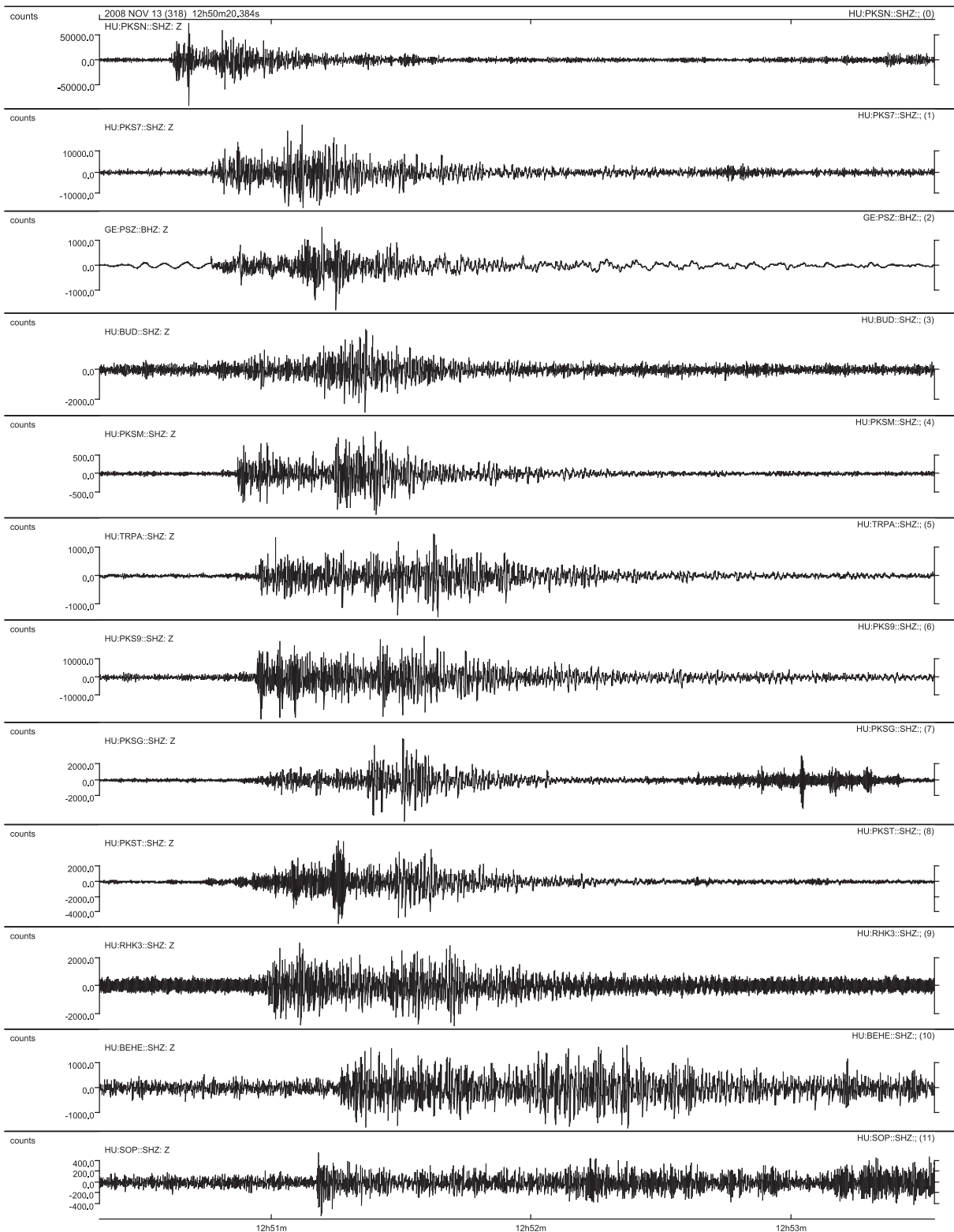
A rengés intenzitás eloszlását a 4.5. táblázat tartalmazza és a 4.10. ábra mutatja.

**DISCUSSION**

Just a few hours after the main shock, a smaller aftershock (3.5  $M_L$ ) was felt and reported from Békés county (Kondoros, 4-5 EMS).

Seismograms of the event are shown in Figure 4.9.

The intensity distribution of the event is shown in Table 4.5 and Figure 4.10.



4.9. ábra A 2008. november 13-i, kondorosi földrengés (12:50 UTC) szeizmogramjai

Figure 4.9. Seismograms of the Kondoros earthquake 13<sup>th</sup> November 2008 (12:50 UTC)

**4.5. Táblázat**

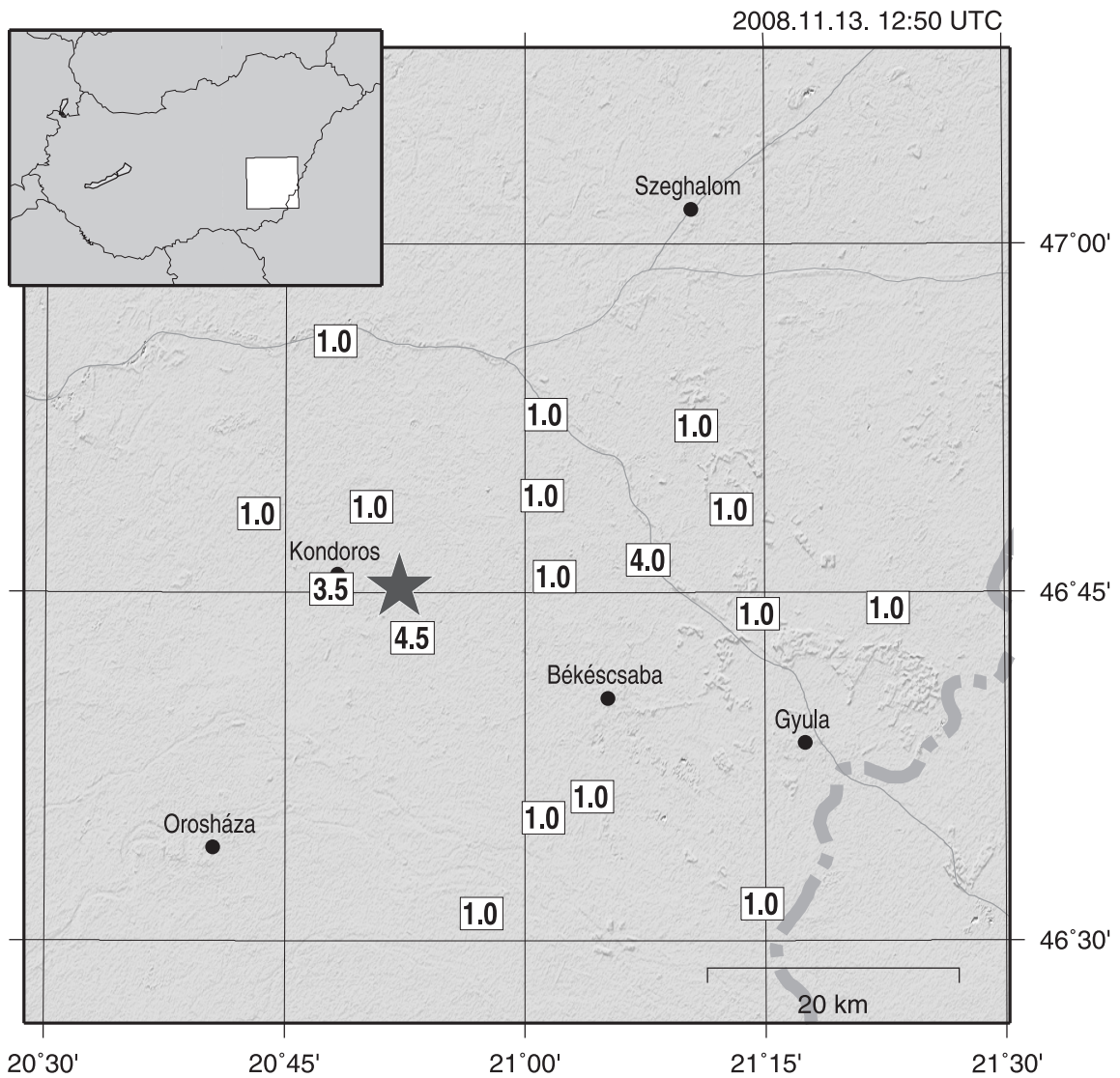
A 2008. november 13-i, kondorosi földrengés (12:50 UTC) intenzitás eloszlása

**Table 4.3.**

Intensity distribution of the Kondoros earthquake 13<sup>th</sup> November 2008 (12:50 UTC)

Helység / Location		Koordináta Coordinates		I Intenzitás Intensity	R Rel. megbízhatóság Rel. reliability	N Jelentések száma No. of reports
		Szélesség Latitude (N)	Hosszúság Longitude (E)			
1	Békés	46.774	21.128	4.0	42%	1
2	Bélmegyer	46.870	21.177	1.0	0%	1
3	Doboz	46.735	21.241	1.0	0%	2
4	Elek	46.527	21.245	1.0	0%	1
5	Gyomaendrőd	46.931	20.800	1.0	0%	1
6	Hunya	46.812	20.838	1.0	0%	1
7	Kardos	46.807	20.720	1.0	0%	1
8	Kétsoprony	46.718	20.882	4.5	33%	1
9	Kondoros	46.753	20.797	3.5	37%	1
10	Köröstarcsa	46.878	21.020	1.0	0%	2
11	Medgyesbodzás	46.520	20.953	1.0	0%	2
12	Mezőberény	46.820	21.016	1.0	0%	2
13	Mezőtúr	47.007	20.623	1.0	0%	2
14	Murony	46.762	21.029	1.0	0%	2
15	Sarkad	46.739	21.377	1.0	0%	1
16	Szabadkígyós	46.604	21.068	1.0	0%	1
17	Tarhos	46.810	21.214	1.0	0%	1
18	Újkígyós	46.589	21.017	1.0	0%	2





**4.10. ábra** A 2008. november 13-i, kondorosi földrengés (12:50 UTC) intenzitás eloszlása (a csillag a műszeresen meghatározott epicentrumot jelöli)

**Figure 4.10.** Intensity distribution of the Kondoros earthquake 13<sup>th</sup> November 2008 (12:50 UTC) (star - instrumental epicentre)

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# A MELLÉKLET

## EURÓPAI MAKROSZEIZMIKUS SKÁLA (EMS)

### 1 ☞ **Nem érezhető**

Nem érezhető, még a legkedvezőbb körülmények között sem.

### 2 ☞ **Alig érezhető**

A rezgést csak egy-egy, elsősorban fekvő ember érzi, különösen magas épületek felsőbb emeletein.

### 3 ☞ **Gyenge**

A rezgés gyenge, néhány ember érzi, főleg épületen belül. A fekvő emberek lengést vagy gyenge remegést éreznek.

### 4 ☞ **Széles körben érezhető**

A rezgést épületen belül sokan érzik, a szabadban kevesen. Néhány ember felébred. A rezgés mértéke nem ijesztő. Ablakok, ajtók, edények megcsörrennek, felfüggesztett tárgyak lengenek.

### 5 ☞ **Erős**

A rezgést épületen belül a legtöbben érzik, a szabadban csak néhányan. Sok alvó ember felébred, néhányan a szabadba menekülnek. Az egész épület remeg, a felfüggesztett tárgyak nagyon lengenek. Tányérok, poharak összekocognak. A rezgés erős. Felül nehéz tárgyak felborulnak. Ajtók, ablakok kinyílnak vagy bezáródnak.

### 6 ☞ **Kiseb károkat okozó**

Épületen belül szinte mindenki, szabadban sokan érzik. Épületben tartózkodók közül sokan megijednek, és a szabadba menekülnek. Kiseb tárgyak leesnek. Hagyományos épületek közül sokban keletkezik kiseb kár, hajszálrepedés a vakolatban, kiseb vakolatdarabok lehullanak.

### 7 ☞ **Károkat okozó**

A legtöbb ember megrémül, és a szabadba menekül. Bútorok elmozdulnak, a polcokról sok tárgy leesik. Sok hagyományos épület szenved mérsékelt sérülést: kiseb repedések keletkeznek a falakban, kémények ledőlnek.

### 8 ☞ **Súlyos károkat okozó**

Bútorok felborulnak. Sok hagyományos épület megsérül: kémények ledőlnek, a falakban nagy repedések keletkeznek, néhány épület részlegesen összedől.

### 9 ☞ **Pusztító**

Oszlopok, műemlékek ledőlnek vagy elferdülnek. Sok hagyományos épület részlegesen, néhány teljesen rombadől.

### 10 ☞ **Nagyon pusztító**

Sok hagyományos épület összedől.

### 11 ☞ **Elsőpró**

A legtöbb épület összedől.

### 12 ☞ **Teljesen elsőpró**

Gyakorlatilag minden építmény megsemmisül.

(Részletesen lásd: Grünthal, 1998)

# APPENDIX A

## EUROPEAN MACROSEISMIC SCALE (EMS)

- 1 ☞ Not felt**

Not felt, even the most favourable circumstances.
- 2 ☞ Scarcely felt**

Vibration is felt only by individual people at rest in houses, especially on upper floors of buildings.
- 3 ☞ Weak**

The vibration is weak and is felt indoors by a few people. People at rest feel a swaying or light trembling.
- 4 ☞ Largely observed**

The earthquake is felt indoors by many people, outdoors by very few. A few people are awakened. The level of vibration is not frightening. Windows, doors and dishes rattle. Hanging objects swing.
- 5 ☞ Strong**

The earthquake is felt indoors by most, outdoors by few. Many sleeping people awake. A few run outdoors. Buildings tremble throughout. Hanging objects swing considerably. China and glasses clatter together. The vibration is strong. Top heavy objects topple over. Doors and windows swing open or shut.
- 6 ☞ Slightly damaging**

Felt by most indoors and many outdoors. Many people in buildings are frightened and run outdoors. Small objects fall. Slight damage to many ordinary buildings eg. fine cracks in plaster and small pieces of plaster fall.
- 7 ☞ Damaging**

Most people are frightened and run outdoors. Furniture is shifted and objects fall from shelves in large numbers. Many ordinary buildings suffer moderate damage: small cracks in walls, partial collapse of chimneys.
- 8 ☞ Heavily damaging**

Furniture may be overturned. Many ordinary buildings suffer damage: chimneys fall, large cracks appear in walls and few buildings may partially collapse.
- 9 ☞ Destructive**

Monuments and columns fall or are twisted. Many ordinary buildings partially collapse and few collapse completely.
- 10 ☞ Very destructive**

Many ordinary buildings collapse.
- 11 ☞ Devastating**

Most ordinary buildings collapse.
- 12 ☞ Completely devastating**

Practically all structures above and below ground are heavily damaged or destroyed.

(For details see Grünthal, 1998)

## B MELLÉKLET

# A VILÁG JELENTŐS FÖLDRENGÉSEI

2008

Forrás:

*U.S. Geological Survey  
National Earthquake Information Center  
(USGS - NEIC)*

## APPENDIX B

# SIGNIFICANT EARTHQUAKES OF THE WORLD

2008

Source:

*U.S. Geological Survey  
National Earthquake Information Center  
(USGS - NEIC)*

## Halálos áldozatot követelő földrengések a világon 2008-ban

## Deaths from Earthquakes in 2008

Dátum Date	Ország, terület Region	Magnitúdó Magnitude	Áldozatok száma Number killed
2008 01 09	Northern Algeria	4.6	1
2008 01 22	Nias region, Indonesia	6.2	1
2008 02 03	Dem. Rep. of the Congo	5.9	44
2008 02 06	West Bengal, India	4.3	1
2008 02 14	Rwanda	5.3	1
2008 02 20	Simeulue, Indonesia	7.4	3
2008 05 12	Eastern Sichuan, China	7.9	87.587
2008 05 24	Colombia	5.9	6
2008 05 25	Sichuan-Gansu region, China	6.1	8
2008 06 06	Northern Algeria	5.5	1
2008 06 08	Greece	6.4	2
2008 06 13	Eastern Honshu, Japan	6.9	13
2008 06 17	Sichuan-Gansu region, China	4.8	2
2008 07 08	Southern Peru	6.2	1
2008 07 15	Dodecanese Islands, Greece	6.4	1
2008 07 23	Eastern Honshu, Japan	6.8	1
2008 07 24	Sichuan-Gansu region, China	5.7	1
2008 08 05	Sichuan-Gansu region, China	6.0	4
2008 08 21	Myanmar-China border region	6.0	5
2008 08 30	Sichuan-Yunnan region, China	5.9	43
2008 08 31	Sichuan-Yunnan region, China	5.5	2
2008 09 09	Southern Sumatra, Indonesia	5.4	2
2008 09 10	Southern Iran	6.1	7
2008 09 16	Maharashtra, India	5.0	1
2008 10 05	Kyrgyzstan	6.6	74
2008 10 06	Eastern Xizang	6.3	10
2008 10 11	Caucasus region, Russia	5.8	13
2008 10 28	Pakistan	6.4	166
2008 11 16	Minahasa, Indonesia	7.3	6
2008 11 22	Czech Republic	4.1	2
2008 12 09	Sichuan-Gansu region, China	5.5	2
Összesen / Total			88.011



## A 7.0 vagy annál nagyobb magnitúdójú földrengések a világon 2008-ban

## Earthquakes of magnitude 7.0 and greater in 2008

	Év Year	Hónap Month	Nap Day	Idő Time (UTC)	Szélesség Latitude	Hosszúság Longitude	Mélység Depth (km)	Magnitúdó Magnitude	Ország, terület Region
1.	2008	02	20	08:08:30.5	2.768	95.964	26	7.4	Simeulue, Indonesia
2.	2008	02	25	08:36:33.0	-2.486	99.972	25	7.2	Kepulauan region, Indonesia
3.	2008	03	20	22:32:57.9	35.490	81.467	10	7.2	Xinjiang-Xizang border region
4.	2008	04	09	12:46:12.7	-20.071	168.892	33	7.3	Loyalty Islands
5.	2008	04	12	00:30:12.6	-55.664	158.453	16	7.1	Macquarie Island
6.	2008	05	12	06:28:01.5	31.002	103.322	19	7.9	Eastern Sichuan, China
7.	2008	06	30	06:17:43.0	-58.227	-22.099	8	7.0	South Sandwich Islands region
8.	2008	07	05	02:12:04.4	53.882	152.886	633	7.7	Sea of Okhotsk
9.	2008	07	19	02:39:28.7	37.552	142.214	22	7.0	Off East Coast of Honshu, Japan
10.	2008	09	29	15:19:31.5	-29.756	-177.683	36	7.0	Kermadec Islands, New Zealand
11.	2008	11	16	17:02:32.7	1.271	122.091	30	7.3	Minahasa, Sulawesi, Indonesia
12.	2008	11	24	09:02:58.7	54.203	154.322	492	7.3	Sea of Okhotsk

**A 6.5 vagy annál nagyobb magnitúdójú,  
és a jelentősebb károkat okozó földrengések a világon 2008-ban**

**Earthquakes of magnitude 6.5 or greater  
or ones that caused fatalities, injuries or substantial damage in 2008**

DÁTUM	IDŐ Ó M S	KOORDINÁTA SZÉL HOSSZ	MÉLYSÉG MAG KM	ÁLLOMÁS SZÁM	RÉGIÓ, TOVÁBBI MAGNITÚDÓK, MEGJEGYZÉSEK
DATE UTC	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT LONG	DEPTH MAG SD	NO. STA USED	REGION, ADDITIONAL MAGNITUDES AND COMMENTS
JAN 01	06 32 27.9	40.288 N 72.985 E	6 G 5.6 0.9	489	KYRGYZSTAN. MW 5.6 (GCMT), 5.5 (GS). mb 5.8 (GS). MS 5.4 (GS). Mo 2.9*10**17 Nm (GCMT), 2.0*10**17 Nm (GS). At least 5,385 buildings damaged or destroyed (V) and about 5,300 people homeless in the Osh area. Felt at Jalal-Abad. Also felt at Kashi, China and at Almaty, Kazakhstan.
JAN 05	11 01 06.1	51.254 N 130.746 W	15 G 6.6 1.3	422	QUEEN CHARLOTTE ISLANDS REGION. MW 6.6 (UCMT), 6.6 (GCMT), 6.5 (GS), 6.5 (PGC). mb 6.0 (GS), MS 6.5 (GS), ME 6.9 (GS), Mo 9.8*10**18 Nm (UCMT), 9.6*10**18 Nm (GCMT), 7.5*10**18 Nm (GS), 7.4*10**18 Nm (PGC), 1.6*10**19 Nm (PPT), Es 5.5*10**14 Nm (GS). Felt (III) at Port Hardy, Sandspit and Skidegate, British Columbia. Also felt at Winter Harbour.
JAN 07	03 12 26.8	0.795 S 134.012 E	12 G 5.9 0.9	253	NEAR THE NORTH COAST OF PAPUA, INDONESIA. MW 5.9 (GCMT), 5.8 (GS), 5.8 (UCMT). mb 6.0 (GS), MS 5.6 (GS), ME 5.6 (GS), Mo 8.1*10**17 Nm (GCMT), 6.5*10**17 Nm (UCMT), 5.8*10**17 Nm (GS), Es 5.7*10**12 Nm (GS). Six people injured and more than 22 buildings damaged or destroyed (V) at Manokwari. Felt (III) at Nabire, Serui and Sorong.
JAN 09	22 24 03.8	35.616 N 0.570 W	10 G 4.6 1.2	286	NORTHERN ALGERIA. mb 4.6 (GS), ML 5.3 (ALG). One person killed and several buildings damaged (V) at Oran.
JAN 15	17 52 15.6	21.984 S 179.535 W	598 D 6.5 1.0	484	FIJI REGION. MW 6.5 (GS), 6.5 (UCMT), 6.5 (GCMT), mb 5.8 (GS), ME 5.7 (GS), Mo 7.3*10**18 Nm (GCMT), 6.4*10**18 Nm (GS), 6.3*10**18 Nm (UCMT), Es 7.9*10**12 Nm (GS). Felt at Lami.
JAN 22	17 14 57.9	1.011 N 97.442 E	20 G 6.2 1.1	157	NIAS REGION, INDONESIA. MW 6.2 (GS), 6.2 (GCMT), 6.1 (UCMT), mb 5.9 (GS), ME 6.1 (GS), Mo 2.5*10**18 Nm (GCMT), 2.4*10**18 Nm (GS), 1.6*10**18 Nm (UCMT), Es 3.6*10**13 Nm (GS). One person killed and five people injured on Nias. Several buildings damaged (V) at Gunungsitoli. Felt (IV) at Sibolga and Singkil and (II) at Padang, Sumatra.
FEB 01	07 33 40.5	36.825 N 3.473 E	10 G 4.6 1.0	176	NORTHERN ALGERIA. mb 4.6 (GS). Three people slightly injured at Boumerdas. Felt (III) at Algiers. Also felt at Bab Ezzouar and Birkhadem.
FEB 03	07 34 12.1	2.296 S 28.900 E	10 G 5.9 0.8	415	LAC KIVU REGION, DEM. REP. OF THE CONGO. MW 5.9 (GS), 5.9 (GCMT), mb 6.1 (GS), MS 5.8 (GS), ME 5.8 (GS), Mo 9.9*10**17 Nm (GCMT), 9.0*10**17 Nm (GS), Es 1.1*10**13 Nm (GS). Seven people killed, 447 injured, 1,087 houses destroyed and 2,378 buildings damaged at Bukavu. Power outages occurred in about 50 percent of the city. Thirty-seven people killed, 643 injured, 1,201 houses destroyed and 24 buildings damaged in the Cyangugu-Nyamasheke area, Rwanda. Felt (IV) at Butare and Kigali. Also felt at Bujumbura and Kirundo, Burundi; Kabanga and Rulenge, Tanzania; and Kabale, Uganda.
FEB 06	06 09 40.4	23.433 N 87.111 E	10 G 4.3 1.1	34	WEST BENGAL, INDIA. mb 4.3 (GS). One person killed and at least 50 injured in the Bankura area. Many buildings damaged at Andal, Durgapur and Panagarh. Felt strongly at Asansol, Bankura, Barjora, Gangajalghati, Mejia, Puruliya, Raniganj and Siuri. Also felt at Dhanbad, Govindpur, Jharia, Nirsra and Ranchi.
FEB 08	09 38 14.1	10.671 N 41.899 W	9 G 6.9 0.9	600	NORTHERN MID-ATLANTIC RIDGE. MW 6.9 (UCMT), 6.9 (GCMT), 6.8 (GS), mb 6.4 (GS), MS 6.9 (GS), ME 7.2 (GS), Mo 3.2*10**19 Nm (GCMT), 2.6*10**19 Nm (UCMT), 2.0*10**19 Nm (GS), Es 1.5*10**15 Nm (GS).
FEB 10	12 22 02.6	60.797 S 25.586 W	8 G 6.6 1.1	264	SOUTH SANDWICH ISLANDS REGION. MW 6.6 (UCMT), 6.5 (GS), 6.5 (GCMT), mb 6.4 (GS), MS 6.5 (GS), Mo 8.3*10**18 Nm (GCMT), 6.8*10**18 Nm (GS), 1.1*10**19 Nm (UCMT).

## A világ jelentős földrengései

## Significant Earthquakes of the World

FEB 12	12 50 18.4	16.357 N	94.304 W	83 G	6.5	1.0	521	OAXACA, MEXICO. MW 6.5 (GCMT), 6.4 (GS), 6.4 (UCMT), mb 6.0 (GS), ME 6.2 (GS), MD 6.6 (UNM), Mo 6.3*10**18 Nm (GCMT), 5.9*10**18 Nm (UCMT), 5.1*10**18 Nm (GS), 4.2*10**18 Nm (PPT). Es 4.5*10**13 Nm (GS). Power outages occurred in the Tuxtla Gutierrez area. Felt (V) at Huatulco; (IV) at Jalapa, Oaxaca, San Cristobal de las Casas and Villahermosa; (III) at Huajuapán, Mexico, Puerto Escondido and Tuxtla Gutierrez. Also felt at Arriaga, Cancun, Cintalapa, Coatepec, Comitán, Cozumel, El Espinal, Etla, Mitla, Paraiso, Pochutla, Tapachula, Tehuacan, Tehuantepec, Tierra Blanca, Tuxpan, Tuxtepec, Veracruz and Xico. Felt (II) at Belize City and San Pedro, Belize. Also felt at Orange Walk and San Ignacio. Felt (II) at Guatemala, Guatemala. Also felt at Flores and Quetzaltenango.
FEB 13	20 55 31.5&	31.730 N	51.200 E	14	4.5		101	CENTRAL IRAN. <THR>. mb 4.5 (GS), mbLg 4.3 (TEH), ML 4.2 (THR). Ten people injured and 70 buildings damaged at Nasirabad.
FEB 14	02 07 46.7	2.404 S	28.918 E	10 G	5.3	0.8	274	RWANDA. MW 5.3 (GCMT), mb 5.4 (GS), MS 4.9 (GS), Mo 9.5*10**16 Nm (GCMT). One person killed, 21 injured and homes damaged at Kigali and 5 buildings severely damaged at Ibanda. Felt at Butare and Ruhengeri. Forty-four people injured at Bukavu, Congo. Also felt at Rulenge, Tanzania.
FEB 14	10 09 22.7	36.501 N	21.670 E	29 G	6.9	1.3	645	SOUTHERN GREECE. MW 6.9 (GCMT), 6.7 (UCMT), 6.6 (GS), mb 6.2 (GS), MS 6.6 (GS), ME 6.6 (GS), ML 6.7 (THE), 6.2 (ATH), Mo 8.5*10**18 Nm (GS), 2.4*10**19 Nm (GCMT), 1.5*10**19 Nm (UCMT), 1.2*10**19 Nm (PPT). Es 1.9*10**14 Nm (GS). Felt (IV) at Amarousion, Iraklion, Kalamata, Palaion Faliron, Patrai and Piraeus; (III) at Agia Paraskevi, Athens, Chania, Kallithea, Khalandrion and Krionerion; (II) at Kifisia, Nea Ionia, Patania and Zografos. Also felt at Agios Dimitrios, Aigaleo, Aigion, Akharnai, Ayios Ioannis, Ayios Stefanos, Corinth, Ekali, Epidavros, Galatsion, Gazion, Glifadha, Itea, Kalivai, Kapandrition, Kato Achaia, Kerkyra, Kissamos, Koroni, Kounoupidhiana, Lefkimi, Markopoulon, Megara, Melissa, Metamorfosis, Methoni, Moskhaton, Nea Liosia, Nea Makri, Nea Smirni, Panteleimon, Peristerion, Pirgos, Psikhikon, Rafina, Skaramangas, Spata, Tripolis, Viron, Voula, Vouliagmeni and Zakynthos. Felt (III) at Cairo, Egypt. Also felt at Alexandria. Felt at Brindisi, Catania and Reggio di Calabria, Italy and in the Valletta area, Malta.
FEB 14	12 08 55.7	36.345 N	21.863 E	28 G	6.5	1.2	650	SOUTHERN GREECE. MW 6.5 (GCMT), 6.0 (UCMT), mb 5.9 (GS), MS 6.0 (GS), ME 6.1 (GS), ML 6.0 (ATH), Mo 8.1*10**18 Nm (GCMT), 1.3*10**18 Nm (UCMT). Es 3.7*10**13 Nm (GS). Felt (III) at Amarousion, Athens and Iraklion. Also felt at Agrinion, Ayios Stefanos, Ilioupoli, Kalamakion, Kalamata, Kallithea, Khalandrion, Khania, Kissamos, Metamorfosis, Nea Ionia, Patrai, Pilos, Piraeus, Sparta, Spata, Vlakhiotis, Voula and Yithion. Felt at Brindisi, Italy.
FEB 15	10 36 19.0	33.327 N	35.305 E	10 G	5.1	1.1	253	LEBANON - SYRIA REGION. MW 5.1 (GCMT), mb 5.0 (GS), ML 5.3 (GII), 5.1 (HLW), 4.6 (NIC), MD 5.0 (BHL), Mo 6.6*10**16 Nm (GCMT). Ten people injured in Lebanon. Buildings damaged (IV) and power outages occurred in the Beirut area, Lebanon. Felt at Baabda, Jounie, Nabatiye et Tahta, Tripoli and Tyre. Felt (V) at Rishon LeZiyyon; (IV) at Haifa and Netanya; (III) at Qiryat Shemona, Ramat Gan, Rehovot, Tel Aviv-Yafo and Zefat, Israel. Also felt at `Akko, Bat Yam, Beersheba, Bene Beraq, Bet She'an, Bet Shemesh, Ganne Tiqwa, Hadera, Hazor, Kafr Qasim, Karmi`el, Kefar Sava, Nahariyya, Nazareth, Petah Tiqwa, Qadima, Qiryat Bialik, Qiryat Motzkin, Qiryat Ono, Qiryat Tiv'on, Ra`ananna, Tiberias, Yamma, Yoqne`am `Illit and Zikhron Ya`aqov. Felt (III) at Jerusalem. Felt (III) at Amman and (II) at Al Jubayhah, Jordan. Also felt at Irbid, Tila` al `Ali and Wadi as Sir. Felt (II) at Larnaca, Cyprus. Felt at Darayya and Qatana, Syria and at Jericho, West Bank.
FEB 20	08 08 30.5	2.768 N	95.964 E	26 G	7.4	1.0	607	SIMEULUE, INDONESIA. MW 7.4 (UCMT), 7.3 (GCMT), mb 6.5 (GS), MS 7.5 (GS), ME 7.1 (GS), Mo 1.6*10**20 Nm (UCMT), 1.1*10**20 Nm (GCMT), 1.1*10**20 Nm (PPT). Es 9.9*10**14 Nm (GS). Three people killed and 25 seriously injured in western Aceh Province, Sumatra. Felt (V) at Meulaboh; (IV) at Banda Aceh, Medan and Tapaktuan; (III) at Padang and Sibolga; (II) at Bukittinggi and Payakumbuh. Also felt at Duri and Lhokseumawe. Felt (III) at Gunungsitoli, Nias. Felt (III) at Butterworth, George Town, Kampong Gelugor, Kampung Sungai Ara, Kuala Lumpur, Petaling Jaya and Tanjong Tokong and (II) at Perai, Malaysia. Also felt at Alor Setar, Ayer Itam, Johor Bahru, Juru, Kajang-Sungai Chua,

											Kampong Baharu Balakong, Kampung Tanjung Bongor, Kampung Tanjung Karang, Klang, Kuah, Kulim, Nibung Tebal and Shah Alam. Felt (III) in Singapore. Also felt at Kathu, Thailand.
FEB 21	14 16 02.7&	41.153 N	114.867 W	7	6.0	518	NEVADA. <REN>. MW 6.0 (UCMT), 6.0 (GCMT), 5.8 (GS), 5.9 (BRK), 5.9 (SLM), mb 5.7 (GS), MS 5.8 (GS), ME 5.7 (GS), Mo 6.8*10**17 Nm (GS), 1.4*10**18 Nm (GCMT), 1.3*10**18 Nm (UCMT), 8.3*10**17 Nm (SLM), 1.0*10**18 Nm (BRK). Es 8.9*10**12 Nm (GS). Three people injured, more than 20 buildings heavily damaged, almost 700 buildings slightly damaged and a water main broken at Wells. Felt (VI) at Wells, with maximum intensity VIII in the Historic District. Felt (V) at Jackpot; (IV) at Battle Mountain, Carlin, Elko, Mountain City and Spring Creek; (III) at Ely, Eureka, Golconda, Lovelock and Winnemucca. Also felt at Las Vegas and Reno. Felt (V) at Grand View and Rogerson; (IV) at Castleford, Filer, Hansen, Heyburn, Malad City, Malta, Paul, Rupert, Twin Falls and Wendell; (III) at American Falls, Bellevue, Boise, Buhl, Burley, Caldwell, Declo, Dietrich, Emmett, Fairfield, Garden Valley, Glens Ferry, Gooding, Hagerman, Hailley, Hazelton, Idaho City, Inkom, Jerome, Ketchum, Kimberly, Middleton, Murtaugh, Nampa, Oakley, Pocatello and Shoshone, Idaho. Also felt (V) at Wendover; (IV) at Farmington, Garland and Snowville; (III) at American Fork, Brigham City, Clearfield, Corinne, Draper, Dugway, Grantsville, Hill AFB, Honeyville, Hooper, Hyde Park, Hyrum, Layton, Lehi, Logan, Ogden, Plymouth, Provo, Richmond, Roy, Sandy, Salt Lake City, Stockton, Syracuse, Tooele, Tremonton, Vernon and West Jordan, Utah. The earthquake was felt in most of Idaho and Nevada, in southeastern Oregon and northwestern Utah, in parts of California and Wyoming, and at Spokane, Washington. Isolated felt reports were received from as far away as Phoenix and Tucson, Arizona; Oakland and Pasadena, California; Brighton, Colorado; Absarokee and Livingston, Montana; Corvallis and Portland, Oregon; and Albuquerque, New Mexico.				
FEB 23	15 57 20.4	57.335 S	23.433 W	14 G	6.8	1.1	338	SOUTH SANDWICH ISLANDS REGION. MW 6.8 (GCMT), 6.7 (UCMT), mb 6.2 (GS), MS 6.7 (GS), ME 6.9 (GS), Mo 1.7*10**19 Nm (GCMT), 1.6*10**19 Nm (UCMT), 2.9*10**19 Nm (PPT). Es 5.7*10**14 Nm (GS).			
FEB 24	14 46 21.4	2.405 S	99.931 E	22 G	6.5	1.0	429	KEPULAUAN MENTAWAI REGION, INDONESIA. MW 6.5 (GCMT), 6.2 (GS), 6.2 (UCMT), mb 6.0 (GS), MS 6.4 (GS), ME 6.0 (GS), Mo 6.9*10**18 Nm (GCMT), 2.8*10**18 Nm (GS), 2.6*10**18 Nm (UCMT). Es 2.0*10**13 Nm (GS). Felt (III) at Padang and (II) at Bengkulu, Sumatra. Also felt (II) in Singapore.			
FEB 25	08 36 33.0	2.486 S	99.972 E	25 G	7.2	1.2	505	KEPULAUAN MENTAWAI REGION, INDONESIA. MW 7.2 (GCMT), 7.0 (UCMT), 6.9 (GS), mb 6.4 (GS), MS 7.3 (GS), ME 7.1 (GS), Mo 7.8*10**19 Nm (GCMT), 3.9*10**19 Nm (UCMT), 2.5*10**19 Nm (GS), 2.5*10**19 Nm (PPT). Es 8.5*10**14 Nm (GS). Felt (III) at Pekanbaru, Sumatra. Also felt at Curup, Duri and Padang. Felt (III) at Johor Bahru, Malaysia. Also felt at George Town, Kuala Lumpur and Petaling Jaya. Felt (III) in Singapore.			
FEB 25	18 06 03.9	2.332 S	99.891 E	25 G	6.6	1.0	421	KEPULAUAN MENTAWAI REGION, INDONESIA. MW 6.6 (GCMT), 6.3 (GS), 6.3 (UCMT), mb 6.0 (GS), MS 6.4 (GS), ME 6.4 (GS), Mo 4.0*10**18 Nm (UCMT), 3.2*10**18 Nm (GS), 1.0*10**19 Nm (GCMT). Es 8.9*10**13 Nm (GS). Felt (V) on Pulau Sipura and (IV) on Siberut. Also felt (IV) at Padang and Painan; (II) at Argamakmur, Batusangkar, Bukittinggi, Kapahiang, Mukomuko, Padangpanjang and Solok, Sumatra. Felt (II) in Singapore.			
FEB 25	21 02 18.4	2.245 S	99.808 E	25 G	6.7	0.9	543	KEPULAUAN MENTAWAI REGION, INDONESIA. MW 6.7 (GCMT), 6.6 (UCMT), 6.5 (GS), mb 6.2 (GS), MS 6.6 (GS), ME 6.7 (GS), Mo 6.5*10**18 Nm (GS), 1.5*10**19 Nm (GCMT), 1.0*10**19 Nm (UCMT). Es 2.6*10**14 Nm (GS). Several homes damaged at Sikakap. Felt (V) on Mentawai and at Painan; (IV) at Padang; (III) at Pari; (II) at Bukittinggi, Kapahiang, Padangpanjang and Payakumbuh, Sumatra. Felt (III) in Singapore.			
FEB 27	00 56 47.8&	53.403 N	0.332 W	18	4.8	361	ENGLAND, UNITED KINGDOM. <BGS>. mb 4.8 (GS), ML 5.3 (GRF), 5.3 (STR), 5.2 (BGS). One person injured and buildings damaged in Lincolnshire and South Yorkshire. Felt (V) at Barnsley, Bedworth, Beeston and Stapleford, Bentley, Beverley, Bicester, Boston, Brigg, Brighouse, Chesterfield, Chorley, Doncaster, Droitwich, East Retford, Eaton Socon, Failsworth, Grantham, Grimsby, Heywood, Hinckley, Ilkeston, Kingston upon Hull, Leicester, Lincoln, Long Eaton, Loughborough, Mablethorpe and Sutton, Mansfield, Matlock, Melton Mowbray, Mold, Morley, Newark, Rotherham, Scunthorpe, Sheffield, Skegness, Sleaford,				

## A világ jelentős földrengései

## Significant Earthquakes of the World

Spalding-Pinchbeck, Stamford, Whitefield and Worksop. Felt widely in the United Kingdom, north to Arbroath, southwest to Falmouth-Penryn and east to Great Yarmouth. Also felt at Douglas, Isle of Man; Antwerp, Brussels and Gent, Belgium; Aniche, France; Letterkenny, Ireland and Haarlem, The Netherlands.

MAR 03	09 31 02.5	46.406 N	153.175 E	10 G	6.5	1.1	556	KURIL ISLANDS. MW 6.5 (UCMT). 6.5 (GCMT). 6.3 (GS). mb 6.2 (GS). MS 6.5 (GS). ME 6.4 (GS). Mo $6.5 \times 10^{18}$ Nm (GCMT), $6.4 \times 10^{18}$ Nm (UCMT), $3.5 \times 10^{18}$ Nm (GS), $1.0 \times 10^{19}$ Nm (PPT). Es $1.0 \times 10^{14}$ Nm (GS).
MAR 03	14 11 14.6	13.351 N	125.630 E	24 G	6.9	0.9	544	PHILIPPINE ISLANDS REGION. MW 6.9 (UCMT). 6.9 (GCMT). 6.8 (GS). mb 6.4 (GS). ME 6.8 (GS). Mo $2.6 \times 10^{19}$ Nm (UCMT), $2.6 \times 10^{19}$ Nm (GCMT), $1.8 \times 10^{19}$ Nm (GS), $1.1 \times 10^{19}$ Nm (PPT). Es $3.4 \times 10^{14}$ Nm (GS). Felt (V PIVS) at San Andres and Virac, Catanduanes. Felt (V PIVS) at Catarman and (III PIVS) at Borongan and Can-Avid, Samar. Felt (V PIVS) at Baao, Iriga and Naga; (IV PIVS) at Daet, Legaspi and Sorsogon; (II PIVS) at Baguio and Guinayangan; (I PIVS) at Manila and Taguig, Luzon. Felt (III PIVS) at Palo and Tacloban, Leyte. Felt (III PIVS) at Iloilo and Roxas City, Panay. Felt (II PIVS) at Cebu City, Cebu and at Masbate, Masbate. Felt at Solano, Luzon.
MAR 20	22 32 57.9	35.490 N	81.467 E	10 G	7.2	1.0	532	XINJIANG-XIZANG BORDER REGION. MW 7.2 (UCMT). 7.1 (GCMT). mb 6.3 (GS). MS 7.3 (GS). ME 6.7 (GS). Mo $8.3 \times 10^{19}$ Nm (UCMT), $5.4 \times 10^{19}$ Nm (GCMT), $1.4 \times 10^{20}$ Nm (PPT). Es $2.6 \times 10^{14}$ Nm (GS). Four houses collapsed at Pulu and about 2,200 houses destroyed or damaged in Lop, Qira and Yutian. A total of 46,594 people were displaced in Xinjiang. Felt at Aqqan and Bostan.
MAR 29	12 51 24.7	12.178 S	77.164 W	51 D	5.3	0.9	283	NEAR THE COAST OF CENTRAL PERU. MW 5.3 (GS). 5.3 (GCMT). mb 5.4 (GS). Mo $9.7 \times 10^{16}$ Nm (GS), $1.1 \times 10^{17}$ Nm (GCMT). Five houses collapsed in Lima and a rockslide caused an injury and vehicle damage along the coastal highway. Felt (V) at Lima; (IV) at Ancon, Callao, Chillca, Chosica, Huaral and Pachacamac; (III) at Calango, Huacho, Ica and San Vicente de Canete; (II) at Chinchta Alta. Also felt at Chaclacayo.
APR 09	12 46 12.7	20.071 S	168.892 E	33 G	7.3	1.3	486	LOYALTY ISLANDS. MW 7.3 (UCMT). 7.3 (GCMT). 7.2 (GS). mb 6.3 (GS). MS 7.3 (GS). ME 6.9 (GS). Mo $9.9 \times 10^{19}$ Nm (UCMT), $7.6 \times 10^{19}$ Nm (GS), $1.1 \times 10^{20}$ Nm (GCMT), $1.3 \times 10^{20}$ Nm (PPT). Es $5.2 \times 10^{14}$ Nm (GS).
APR 12	00 30 12.6	55.664 S	158.453 E	16 G	7.1	1.0	541	MACQUARIE ISLAND REGION. MW 7.1 (UCMT). 7.1 (GCMT). 6.8 (GS). mb 6.8 (GS). MS 7.1 (GS). ME 6.9 (GS). Mo $6.3 \times 10^{19}$ Nm (UCMT), $5.5 \times 10^{19}$ Nm (GCMT), $1.9 \times 10^{19}$ Nm (GS), $9.7 \times 10^{19}$ Nm (PPT). Es $4.4 \times 10^{14}$ Nm (GS).
APR 16	05 54 19.6	51.878 N	179.165 W	13 G	6.6	0.9	676	ANDREANOF ISLANDS, ALEUTIAN IS., ALASKA. MW 6.6 (UCMT). 6.6 (GCMT). 6.5 (GS). mb 6.1 (GS). MS 6.5 (GS). ME 7.2 (GS). Mo $9.8 \times 10^{18}$ Nm (GCMT), $8.5 \times 10^{18}$ Nm (UCMT), $7.1 \times 10^{18}$ Nm (GS), $1.0 \times 10^{19}$ Nm (PPT). Es $1.5 \times 10^{15}$ Nm (GS). Felt on Adak.
APR 24	12 14 49.9	1.182 S	23.471 W	10 G	6.5	0.9	328	CENTRAL MID-ATLANTIC RIDGE. MW 6.5 (UCMT). 6.5 (GCMT). 6.3 (GS). mb 5.4 (GS). MS 6.0 (GS). Mo $6.3 \times 10^{18}$ Nm (GCMT), $6.1 \times 10^{18}$ Nm (UCMT), $3.7 \times 10^{18}$ Nm (GS).
MAY 01	00 15 27.48	33.860 N	48.590 E	16	4.5		122	WESTERN IRAN. <TEH>. mb 4.5 (GS). mbLg 4.7 (TEH). ML 4.7 (THR). More than 100 people injured in Lorestan, including at least 70 people injured at Boroujerd.
MAY 02	01 33 37.2	51.864 N	177.528 W	14 G	6.6	1.2	661	ANDREANOF ISLANDS, ALEUTIAN IS., ALASKA. MW 6.6 (UCMT). 6.6 (GCMT). 6.5 (GS). mb 6.3 (GS). MS 6.8 (GS). ME 7.1 (GS). Mo $9.7 \times 10^{18}$ Nm (GCMT), $7.7 \times 10^{18}$ Nm (GS), $1.1 \times 10^{19}$ Nm (UCMT), $1.1 \times 10^{19}$ Nm (PPT). Es $1.0 \times 10^{15}$ Nm (GS). Felt on Adak.
MAY 07	16 45 18.7	36.164 N	141.526 E	27 G	6.9	0.8	519	NEAR THE EAST COAST OF HONSHU, JAPAN. MW 6.9 (GCMT). 6.8 (UCMT). 6.7 (GS). 6.8 (NIED). mb 6.1 (GS). MS 6.7 (GS). ME 6.6 (GS). Mo $2.4 \times 10^{19}$ Nm (GCMT), $2.2 \times 10^{19}$ Nm (UCMT), $1.2 \times 10^{19}$ Nm (GS), $2.3 \times 10^{19}$ Nm (PPT), $2.0 \times 10^{19}$ Nm (NIED). Es $1.7 \times 10^{14}$ Nm (GS). Six people slightly injured in Chiba, Ibaraki, Saitama and Tokyo. Power outages occurred at Tsukuba. Felt (V) at Tsukuba; (IV) at Tokyo and Zushi; (III) at Atsugi, Ayase-shi, Misawa, Narita, Yokohama and Yokosuka. Felt throughout northern and east-central Honshu. Recorded (5L JMA) in Ibaraki and Tochigi; (4 JMA) in Chiba, Fukushima, Miyagi and Saitama; (2 JMA) throughout northern Honshu.

## Significant Earthquakes of the World

## A világ jelentős földrengései

MAY 09	21 51 29.7	12.516 N	143.181 E	76 G	6.8	1.0	330	GUAM REGION. MW 6.8 (GCMT), 6.7 (UCMT), 6.6 (GS), mb 6.1 (GS), ME 6.8 (GS), Mo 1.7*10**19 Nm (GCMT), 1.6*10**19 Nm (UCMT), 1.1*10**19 Nm (GS), 1.1*10**19 Nm (PPT), Es 3.0*10**14 Nm (GS). Felt (IV) at Barrigada, Hagatna, Santa Rita, Tamuning and Yigo. Felt at Agat. Felt (II) on Saipan and also felt on Tinian, Northern Mariana Islands.
MAY 12	06 28 01.5	31.002 N	103.322 E	19 G	7.9	1.2	774	EASTERN SICHUAN, CHINA. MW 7.9 (UCMT), 7.9 (GCMT), mb 6.9 (GS), MS 8.1 (GS), ME 7.7 (GS), Mo 9.0*10**20 Nm (GCMT), 7.6*10**20 Nm (UCMT), 1.3*10**21 Nm (PPT), Es 7.7*10**15 Nm (GS). At least 69,195 people killed, 374,177 injured and 18,392 missing and presumed dead in the Chengdu-Lixian-Guangyuan area. More than 45.5 million people in 10 provinces and regions were affected. At least 15 million people were evacuated from their homes and more than 5 million were left homeless. An estimated 5.36 million buildings collapsed and more than 21 million buildings were damaged in Sichuan and in parts of Chongqing, Gansu, Hubei, Shaanxi and Yunnan. The total economic loss was estimated at 86 billion US dollars. Beichuan, Dujiangyan, Wuolong and Yingxiu were almost completely destroyed. Landslides and rockfalls damaged or destroyed several mountain roads and railways and buried buildings in the Beichuan-Wenchuan area, cutting off access to the region for several days. At least 700 people were buried by a landslide at Qingchuan. Landslides also dammed several rivers, creating 34 barrier lakes which threatened about 700,000 people downstream. A train was buried by a landslide near Longnan, Gansu. At least 2,473 dams sustained some damage and more than 53,000 km of roads and 48,000 km of tap water pipelines were damaged. About 1.5 km of surface faulting was observed near Qingchuan, surface cracks and fractures occurred on three mountains in the area, and subsidence and street cracks were observed in the city itself. Maximum intensity XI was assigned in the Wenchuan area. Felt (VIII) at Deyang and Mianyang; (VII) at Chengdu; (VI) at Luzhou and Xi'an; (V) at Chongqing, Guozhen, Lanzhou, Leshan, Wu'an, Xichang and Ya'an. Felt in much of central, eastern and southern China, including Beijing, Guangzhou, Hefei, Nanjing, Shanghai, Tianjin, Wuhan and in Hong Kong. Also felt in parts of Bangladesh, Taiwan, Thailand and Vietnam. Seiches were observed at Kotalipara, Bangladesh.
MAY 23	19 35 34.7	7.313 N	34.897 W	8 G	6.5	0.9	556	CENTRAL MID-ATLANTIC RIDGE. MW 6.5 (UCMT), 6.5 (GCMT), 6.4 (GS), mb 6.0 (GS), MS 6.4 (GS), ME 7.0 (GS), Mo 6.6*10**18 Nm (UCMT), 6.4*10**18 Nm (GCMT), 4.5*10**18 Nm (GS), Es 6.7*10**14 Nm (GS).
MAY 24	19 20 42.4	4.330 N	73.764 W	9	5.9	1.0	466	COLOMBIA. MW 5.9 (UCMT), 5.9 (GCMT), mb 5.6 (GS), MS 5.6 (GS), ML 5.7 (RSNC), Mo 8.3*10**17 Nm (UCMT), 8.0*10**17 Nm (GCMT). At least 6 people killed by a landslide in Meta. Several buildings damaged at Quetame. Felt (V) at Bogota, (IV) at Chia and (III) at Medellin. Felt widely in Colombia.
MAY 25	08 21 49.9	32.560 N	105.423 E	18 G	6.1	0.7	397	SICHUAN-GANSU BORDER REGION, CHINA. MW 6.1 (GCMT), 6.0 (GS), 6.0 (UCMT), mb 5.8 (GS), MS 6.0 (GS), Mo 1.6*10**18 Nm (GCMT), 1.1*10**18 Nm (GS), 1.1*10**18 Nm (UCMT). Eight people killed, 927 injured, at least 400,000 homes destroyed and a road blocked by a mudslide in Sichuan. Felt (IV) at Chengdu, Lanzhou and Xi'an; (III) at Chongqing. Also felt at Baoji, Dawan, Jiexiu, Xianyang, Yanan and Zigong.
MAY 27	08 37 51.5	32.710 N	105.540 E	10 G	5.7	0.8	366	SICHUAN-GANSU BORDER REGION, CHINA. MW 5.7 (UCMT), 5.5 (GCMT), mb 5.5 (GS), MS 5.2 (GS), Mo 4.3*10**17 Nm (UCMT), 2.1*10**17 Nm (GCMT). About 20,000 additional houses destroyed in Shaanxi and Sichuan. Felt (III) at Chengdu and Xi'an. Also felt at Baoji, Chongqing, Hanzhong, Lanzhou, Pingliang and Xianyang.
MAY 29	15 46 00.3	64.005 N	21.013 W	9 G	6.3	1.0	591	ICELAND. MW 6.3 (GCMT), 6.2 (GS), 6.2 (UCMT), mb 5.9 (GS), MS 6.2 (GS), ME 6.7 (GS), ML 6.1 (REY), Mo 3.4*10**18 Nm (GCMT), 2.7*10**18 Nm (UCMT), 2.3*10**18 Nm (GS), Es 2.2*10**14 Nm (GS). About 30 people injured at Selfoss. Some sheep were killed, buildings damaged and utilities cut off in the Hveragerdhi-Selfoss area. The road between Reykjavik and Selfoss was damaged and rockslides occurred in Vestmannaeyjum. A steaming fissure opened in an existing area of geothermal springs. Felt (VIII) at Hveragerdhi and Selfoss; (V) at Keflavik; (IV) at Hafnarfjordhur, Kopavogur and Reykjavik. Felt at Akranes, Akureyri, Alftanes, Borgarnes, Eyrarbakki, Hvammstangi, Isafjordhur, Laugaras, Reykholar, Reykholt, Saudharkrokur and in Mosfellsbaer. Also felt on Seltjarnarnes and Vestmannaeyjar.
JUN 01	14 31 03.0	59.384 S	149.660 E	10 G	6.5	1.2	157	WEST OF MACQUARIE ISLAND. MW 6.5 (GS), 6.5 (UCMT), 6.5 (GCMT), mb

## A világ jelentős földrengései

## Significant Earthquakes of the World

											5.8 (GS). MS 6.3 (GS). Mo 7.7*10**18 Nm (UCMT). 6.9*10**18 Nm (GCMT). 6.5*10**18 Nm (GS). 3.6*10**18 Nm (PPT).
JUN 06	20 02 56.8	35.883 N	0.658 W	4 G	5.5	1.1	476				NORTHERN ALGERIA. MW 5.5 (GS), 5.5 (UCMT), 5.5 (GCMT). mb 5.5 (GS). MS 5.3 (GS). ML 5.5 (ALG). Mo 2.5*10**17 Nm (UCMT), 2.2*10**17 Nm (GS), 2.2*10**17 Nm (GCMT). One person killed by a rockfall and more than 30 people injured in the Oran area. Several homes were destroyed at Gambetta. Felt (VI) at Mostaganem and Oran. Felt at Hassi Mameche and Sidi Bel Abbes. Also felt at Huercaí-Overa, Lumbreras, Mazarron and Torrevieja, Spain.
JUN 06	21 16 33.8	24.702 N	84.964 E	11 *	3.8	0.8	27				BIHAR-JHARKHAND BORDER REGION, INDIA. mb 3.8 (GS). At least 2 people injured, minor damage and power outages occurred in the Manpur area. Felt at Atri, Gaya, Gararu, Paraiya and Tankuppa.
JUN 08	12 25 29.7	37.963 N	21.525 E	16 G	6.4	1.5	706				SOUTHERN GREECE. MW 6.4 (GCMT), 6.3 (UCMT), 6.2 (GS). mb 6.2 (GS). MS 6.3 (GS). ME 7.0 (GS). ML 6.5 (ATH). Mo 4.6*10**18 Nm (GCMT), 3.1*10**18 Nm (UCMT), 2.5*10**18 Nm (GS). Es 6.3*10**14 Nm (GS). Two people killed, at least 240 injured and at least 1,156 buildings damaged or destroyed in Achaia and Ileia. Felt (VIII) at Kato Achaia; (VII) at Patrai and Rion; (VI) at Agrinion; (V) at Corinth, Tripolis and Zakynthos; (IV) at Agia Paraskevi, Aigina, Argostolion, Athens, Ioannina, Kallithea, Karditsa, Kifisia, Nydri, Preveza, Trikala and Volos; (III) at Amarousion, Galatsion, Glifadha, Kalamakion, Kalandrion, Larisa, Nea Erithraia, Nea Ionia, Nea Smirni, Nikaia, Palaion Faliron and Piraeus; (II) at Aigaleo, Chani, Korydallos and Voula. Felt in most parts of Greece. Also felt at Tirana, Albania; Barletta, Brindisi, Cosenza, Lecce, Matera, Naples and Taranto, Italy; Ohrid, Macedonia.
JUN 13	23 43 45.3&	39.030 N	140.881 E	8	6.9		654				EASTERN HONSHU, JAPAN. <JMA>. MW 6.9 (GCMT), 6.8 (GS), 6.8 (UCMT), 6.9 (NIED). mb 6.5 (GS). MS 7.0 (GS). ME 6.7 (GS). Mo 2.6*10**19 Nm (GCMT), 2.3*10**19 Nm (UCMT), 1.9*10**19 Nm (GS), 7.5*10**19 Nm (PPT), 2.7*10**19 Nm (NIED). Es 2.6*10**14 Nm (GS). At least 13 people killed, 357 injured, 614 buildings damaged and landslides occurred in the Furukawa-Kurihara-Morioka area. Felt (VII) at Furukawa; (VI) at Sendai; (IV) at Misawa and Tsukuba; (III) at Tokyo. Felt as far north as Hirosaki and as far south as Yokohama. Recorded (6U JMA) in Iwate and Miyagi; (5U JMA) in Akita; (5L JMA) in Fukushima and Yamagata; (4 JMA) throughout northern Honshu. Recorded (1 JMA) as far south as Aichi. Recorded (3 JMA) in southwestern Hokkaido, (2 JMA) in the Tomakomai-Shizunai area and (1 JMA) throughout southern Hokkaido.
JUN 17	05 51 43.2	32.761 N	105.554 E	10 G	4.8	1.1	108				SICHUAN-GANSU BORDER REGION, CHINA. mb 4.8 (GS). Two people killed and one injured in Shaanxi.
JUN 27	11 40 13.9	11.005 N	91.824 E	17 G	6.6	0.9	630				ANDAMAN ISLANDS, INDIA REGION. MW 6.6 (UCMT), 6.6 (GCMT), 6.4 (GS). mb 6.4 (GS). MS 6.7 (GS). ME 6.9 (GS). Mo 9.6*10**18 Nm (UCMT), 8.8*10**18 Nm (GCMT), 5.4*10**18 Nm (GS), 2.2*10**19 Nm (PPT). Es 5.3*10**14 Nm (GS). Felt (IV) at Port Blair and (II) at Chennai. Also felt at Bhubaneswar and Tambaram.
JUN 30	06 17 43.0	58.227 S	22.099 W	8 G	7.0	1.4	309				SOUTH SANDWICH ISLANDS REGION. MW 7.0 (UCMT), 7.0 (GCMT), 6.9 (GS). mb 6.1 (GS). MS 6.7 (GS). ME 7.6 (GS). Mo 3.4*10**19 Nm (UCMT), 3.4*10**19 Nm (GCMT), 2.4*10**19 Nm (GS), 9.2*10**18 Nm (PPT). Es 4.9*10**15 Nm (GS).
JUL 01	00 17 33.2	10.368 S	75.512 W	33	5.5	0.9	362				CENTRAL PERU. MW 5.5 (GCMT). mb 5.4 (GS). MS 5.0 (GS). ML 5.3 (LIM). Mo 1.9*10**17 Nm (GCMT). Forty-five people injured in Oxapampa. About 60 houses destroyed and 25 damaged in Huancabamba. Landslides destroyed roads between Huancabamba and Pozuzo. Felt (VI) at Espiritu Pata, Huancabamba, Jatunpata, Lanturache, Tingo and Torrebamba; (III) at Chotabanda, Oxapampa, Palcazu and Pozuzo; (II) at Puerto Bermudez and Villa Rica.
JUL 05	02 12 04.4	53.882 N	152.886 E	633	7.7	0.8	777				SEA OF OKHOTSK. MW 7.7 (GS), 7.7 (UCMT), 7.7 (GCMT). mb 6.8 (GS). Mo 4.3*10**20 Nm (GS), 4.2*10**20 Nm (GCMT), 4.0*10**20 Nm (UCMT), 2.0*10**20 Nm (PPT). Felt at Klyuchi, Petropavlovsk-Kamchatskiy and Yuzhno-Sakhalinsk, Russia. Recorded (2 JMA) in eastern and northern Hokkaido, Japan. Also recorded (2 JMA) in Miyagi and (1 JMA) in Akita, Aomori, Iwate and Yamagata, Honshu.
JUL 08	09 13 07.4	15.986 S	71.748 W	123 G	6.2	0.9	467				SOUTHERN PERU. MW 6.2 (GS), 6.2 (UCMT), 6.2 (GCMT). mb 5.8 (GS). ME 6.0 (GS). Mo 2.5*10**18 Nm (GCMT), 2.2*10**18 Nm (GS), 2.2*10**18 Nm (UCMT). Es 2.2*10**13 Nm (GS). One person killed and several buildings damaged (V) at Arequipa. Felt (V) at Aplao

											and Sihuas; (IV) at Chivay, Chuquibamba and Pampacolca. Felt at Ilo. Also felt (IV) at Arica and Putre; (III) at Alcerreca and Tacora; (II) at Alto Hospicio, Camina, Huara, Iquique, Pica and Pozo Almonte, Chile.
JUL 15	03 26 34.7	35.800 N	27.860 E	52 G	6.4	1.4	774	DODECANESE ISLANDS, GREECE. MW 6.4 (UCMT), 6.4 (GCMT), 6.3 (GS). mb 6.5 (GS). ME 6.5 (GS). Mo $4.5 \times 10^{18}$ Nm (GCMT), $4.4 \times 10^{18}$ Nm (UCMT), $3.2 \times 10^{18}$ Nm (GS). Es $1.3 \times 10^{14}$ Nm (GS). One person killed on Rhodes. Felt (VII) at Trianta, (VI) at Lardos, (V) at Rodos and (III) at Iraklion and Kos. Also felt at Afantou, Antimacheia, Ayios Nikolaos, Chania, Gazion, Ierapetra, Kallithea, Karpathos, Kissamos, Kolimvarion, Masari, Neapolis, Oia, Rethymnon, Soroni, Thira and on Simi. Felt (V) at Marmaris, (IV) at Alanya and Bodrum and (III) at Fethiye, Turkey. Also felt at Antalya, Aydin, Izmir, Kusadasi, Milas, Mugla, Soke and Urla. Felt (III) at Paphos and (II) at Limassol, Cyprus. Also felt at Kyrenia, Nicosia and Polis. Felt (III) at Alexandria, Al Jizah and Cairo, Egypt. Also felt at Az Zaqaqiq, Damanhur, Fa'id and Tanta. Felt at Kefar Sava and Haifa, Israel; at Beirut, Lebanon; at Ramallah, West Bank and at Damascus, Syria.			
JUL 19	02 39 28.7	37.552 N	142.214 E	22 G	7.0	0.8	577	OFF THE EAST COAST OF HONSHU, JAPAN. MW 7.0 (UCMT), 6.9 (GCMT), 6.8 (GS). mb 6.2 (GS). MS 7.0 (GS). ME 6.6 (GS). Mo $3.8 \times 10^{19}$ Nm (UCMT), $3.1 \times 10^{19}$ Nm (GCMT), $2.2 \times 10^{19}$ Nm (GS), $2.9 \times 10^{19}$ Nm (PPT). Es $1.9 \times 10^{14}$ Nm (GS). Felt (III) at Misawa, Tokyo and Yokohama; (II) at Yamato. Felt as far west as Niigata and as far south as Mishima. A small tsunami was observed along the coast of Fukushima and Miyagi. Recorded (4 JMA) in Fukushima, Iwate, Miyagi and Tochigi; (3 JMA) in Akita, Aomori, Chiba, Gumma, Ibaraki, Kanagawa, Nagano, Niigata, Saitama, Tokyo, Yamagata and Yamanashi; (2 JMA) in Aichi and Shizuoka; (1 JMA) in Gifu, Ishikawa and Shiga. Also recorded (2 JMA) in southern Hokkaido and (1 JMA) on Nii-jima.			
JUL 19	09 27 01.4	11.041 S	164.493 E	11 G	6.6	0.9	452	SANTA CRUZ ISLANDS REGION. MW 6.6 (GS), 6.6 (UCMT), 6.6 (GCMT). mb 6.1 (GS). MS 6.4 (GS). ME 6.4 (GS). Mo $8.9 \times 10^{18}$ Nm (GCMT), $8.8 \times 10^{18}$ Nm (UCMT), $8.7 \times 10^{18}$ Nm (GS), $2.4 \times 10^{19}$ Nm (PPT). Es $7.9 \times 10^{13}$ Nm (GS).			
JUL 23	15 26 19.9	39.802 N	141.464 E	108 G	6.8	0.9	633	EASTERN HONSHU, JAPAN. MW 6.8 (GS), 6.8 (UCMT), 6.8 (GCMT). mb 6.6 (GS). ME 6.7 (GS). Mo $2.0 \times 10^{19}$ Nm (GS), $1.9 \times 10^{19}$ Nm (UCMT), $1.8 \times 10^{19}$ Nm (GCMT), $9.8 \times 10^{18}$ Nm (PPT). Es $2.8 \times 10^{14}$ Nm (GS). One person killed, about 200 injured, 90 buildings damaged, landslides occurred, roads closed, train service and power disrupted in northern Honshu. Felt (VII) at Misawa; (IV) in Ayase-shi and at Tsukuba; (III) at Narita, Ome, Tokyo, Yokohama and Yokosuka. Also felt (III) at Sapporo, Hokkaido. Felt widely in southwestern Hokkaido and in Honshu as far south as the Tokyo area. Recorded (6U JMA) in Iwate; (6L JMA) in Aomori; (5U JMA) in Miyagi; (4 JMA) in Akita, Fukushima, Ibaraki and Yamagata; (3 JMA) in Chiba, Gumma, Kanagawa, Niigata, Saitama, Tochigi and Tokyo; (2 JMA) in Ishikawa, Nagano, Shizuoka and Yamanashi; (1 JMA) in Aichi, Fukui and Shiga. Also recorded (4 JMA) in eastern and southern Hokkaido; (2 JMA) on Hachijo-jima, Miyake-jima and O-shima; (1 JMA) on Aogo-shima, Kozu-shima and Mikura-jima.			
JUL 23	19 54 45.1	32.748 N	105.497 E	10 G	5.5	0.9	370	SICHUAN-GANSU BORDER REGION, CHINA. MW 5.5 (UCMT), 5.5 (GCMT). mb 5.7 (GS). MS 5.2 (GS). Mo $2.5 \times 10^{17}$ Nm (UCMT), $2.1 \times 10^{17}$ Nm (GCMT). Casualties and damage are included with the event on July 24 at 07:09 UTC. Felt (IV) at Baoji and Hanzhong; (III) at Xi'an. Felt at Ankang, Chengdu, Deyang, Guangyuan, Leshan, Mianyang and Nanchong.			
JUL 24	07 09 30.0	32.747 N	105.542 E	10 G	5.7	1.0	395	SICHUAN-GANSU BORDER REGION, CHINA. MW 5.7 (UCMT), 5.6 (GCMT). mb 5.6 (GS). MS 5.4 (GS). Mo $5.1 \times 10^{17}$ Nm (UCMT), $2.8 \times 10^{17}$ Nm (GCMT). One person killed, 17 injured and 1,200 houses destroyed in Sichuan. Felt (IV) at Chengdu and (II) at Xi'an. Also felt at Baoji, Beidao, Chongqing, Deyang, Hanzhong, Mianyang, Nanchong, Xianyang and Yanliang.			
JUL 26	18 51 50.9	24.788 N	90.536 E	18	4.8	0.7	185	BANGLADESH. mb 4.8 (GS). MS 4.1 (GS). At least 25 people injured at Dhaka. Felt (IV) at Dhaka. Felt at Maimansingh. Also felt at Agartala, India.			
JUL 29	18 42 15.7&	33.953 N	117.761 W	15	5.4		392	GREATER LOS ANGELES AREA, CALIFORNIA. <PAS>. MW 5.4 (UCMT), 5.4 (GCMT), 5.3 (GS), 5.4 (PAS). mb 5.5 (GS). MS 5.5 (GS). ME 5.4 (GS). Mo $1.7 \times 10^{17}$ Nm (GCMT), $1.6 \times 10^{17}$ Nm (UCMT), $1.3 \times 10^{17}$ Nm (GS), $1.5 \times 10^{17}$ Nm (PAS). Es $2.7 \times 10^{12}$ Nm (GS). Three			



## A világ jelentős földrengései

## Significant Earthquakes of the World

											<p>people injured at Brea and five people injured in the Wilshire District of Los Angeles. Minor damage to windows and brick walls at Los Angeles and Topanga. Felt (VI) at Anaheim, Artesia, Brea, Chino, Chino Hills, Covina, Diamond Bar, Fullerton, La Puente, Los Alamitos, Montclair, Pomona, Placentia, San Dimas, Walnut, West Covina, Whittier and Yorba Linda; (V) at Alhambra, Azusa, Baldwin Park, Bell, Bellflower, Buena Park, Canoga Park, Cerritos, Claremont, Cypress, Downey, El Monte, Garden Grove, Glendora, Hacienda Heights, Hawaiian Gardens, Lakewood, La Mirada, La Palma, La Verne, Lynwood, May Wood, Mira Loma, Montrose, Mount Baldy, North Hollywood, Northridge, Norwalk, Ontario, Panorama City, Paramount, Pico Rivera, Rancho Cucamonga, Reseda, Rosemead, Rowland Heights, San Gabriel, Santa Fe Springs, Seal Beach, South El Monte, Southgate, South Pasadena, Stanton, Upland, Winnetka and Woodland Hills. Felt (IV) in much of the surrounding Los Angeles basin and in much of southern California. Felt (III) at Las Vegas and (II) at North Las Vegas and Pahrump, Nevada. Felt at Henderson, Nevada and at Bullhead City, Flagstaff, Kingman, Mesa, Phoenix and Yuma, Arizona. Also felt at Tijuana, Baja California.</p>
AUG 01	08 32 43.0	32.036 N	104.722 E	7 G	5.7	0.7	516	SICHUAN-GANSU BORDER REGION, CHINA. MW 5.7 (GS), 5.7 (GCMT). mb 5.9 (GS). MS 5.6 (GS). Mo $4.9 \times 10^{17}$ Nm (GS), $4.1 \times 10^{17}$ Nm (GCMT). At least 231 people injured, 540 houses destroyed and 2,450 houses damaged in Beichuan and Pingwu. Several landslides and rockfalls blocked roads in Pingwu. Cellular phone service interrupted in Beichuan. Felt (V) at Mianyang; (III) at Chengdu and Chongqing; (II) at Xi'an. Also felt at Ankang, Baoji, Daxian, Deyang, Fuling, Guangyuan, Hanzhong, Jiangyou, Lanzhou, Leshan, Luzhou, Nanchong, Nanlong, Tianshui, Ya'an, Yanliang and Yibin.			
AUG 05	09 49 17.2	32.756 N	105.494 E	6 G	6.0	1.0	449	SICHUAN-GANSU BORDER REGION, CHINA. MW 6.0 (GCMT), 5.9 (UCMT). mb 5.9 (GS). MS 6.0 (GS). ME 6.0 (GS). Mo $1.1 \times 10^{18}$ Nm (GCMT), $1.0 \times 10^{18}$ Nm (UCMT). Es $2.3 \times 10^{13}$ Nm (GS). Four people killed, 29 injured, and several buildings and roads damaged in the Qingchuan area. Felt (III) at Chengdu and Xi'an. Also felt at Beibei, Chongqing, Daxian, Guangyuan, Luoyang, Mianyang, Nanchong and Xianyang.			
AUG 09	06 01 48.5*	60.648 S	153.771 E	10 G	6.5	1.6	99	WEST OF MACQUARIE ISLAND. MW 6.5 (UCMT), 6.4 (GCMT). mb 5.6 (GS). MS 5.9 (GS). Mo $6.1 \times 10^{18}$ Nm (UCMT), $5.1 \times 10^{18}$ Nm (GCMT).			
AUG 21	12 24 29.5	25.044 N	97.684 E	1 G	6.0	0.9	234	MYANMAR-CHINA BORDER REGION. MW 6.0 (GS), 6.0 (UCMT), 6.0 (GCMT). mb 5.6 (GS). MS 5.9 (GS). Mo $1.3 \times 10^{18}$ Nm (UCMT), $1.2 \times 10^{18}$ Nm (GCMT), $1.1 \times 10^{18}$ Nm (GS). Five people killed, 127 injured and severe damage at Yingjiang, China. Felt (II) at Bangkok, Thailand.			
AUG 25	13 21 58.8	30.901 N	83.520 E	12 G	6.7	1.1	325	WESTERN XIZANG. MW 6.7 (UCMT), 6.7 (GCMT), 6.6 (GS). mb 6.2 (GS). MS 6.5 (GS). ME 6.2 (GS). Mo $8.6 \times 10^{18}$ Nm (GS), $1.4 \times 10^{19}$ Nm (GCMT), $1.2 \times 10^{19}$ Nm (UCMT), $2.5 \times 10^{19}$ Nm (PPT). Es $4.5 \times 10^{13}$ Nm (GS). About 700 rooms damaged (VIII) in Zhongba County. Ten km of surface faulting with sandblows along 4.2 km of the fracture zone observed in the epicentral area. Felt strongly at Bahraich and Lucknow and (III) at Delhi, India. Felt in parts of Haryana, Himachal Pradesh, Uttar Pradesh and Uttarakhand. Also felt at Kathmandu, Nepalganj and in the Tarai region, Nepal.			
AUG 30	08 30 54.0	26.272 N	101.937 E	17 G	5.9	0.9	363	SICHUAN-YUNNAN BORDER REGION, CHINA. MW 5.9 (GCMT), 5.8 (GS). mb 5.7 (GS). MS 5.8 (GS). Mo $9.4 \times 10^{17}$ Nm (GCMT), $6.7 \times 10^{17}$ Nm (GS). At least 32 people killed and 321 injured at Huili; 6 people killed and 132 injured at Chuxiong; 5 people killed and 132 injured at Panzhihua; 4 people injured at Kunming. At least 392,000 houses damaged or destroyed in the Sichuan-Yunnan area. At least 66 schools, 22 bridges, 131 roads and 19 reservoirs damaged at Panzhihua. Chengdu-Kunming railroad service interrupted. Strongly felt at Panzhihua and Xichang. Felt (III) at Kunming. Also felt at Chengdu, Dali and Yibin.			
AUG 31	08 31 10.7	26.232 N	101.970 E	10 G	5.5	0.8	306	SICHUAN-YUNNAN BORDER REGION, CHINA. MW 5.5 (GCMT), 5.3 (GS). mb 5.5 (GS). MS 5.2 (GS). Mo $2.5 \times 10^{17}$ Nm (GCMT), $1.3 \times 10^{17}$ Nm (GS). Two people killed in the Panzhihua area. Felt (III) at Kunming. Also felt at Xichang.			
SEP 08	18 52 06.9	13.501 S	166.967 E	110 G	6.9	0.9	531	VANUATU. MW 6.9 (GS), 6.9 (UCMT), 6.9 (GCMT). mb 6.4 (GS). ME 7.0 (GS). Mo $3.1 \times 10^{19}$ Nm (GS), $3.0 \times 10^{19}$ Nm (GCMT), $2.9 \times 10^{19}$ Nm (UCMT), $3.5 \times 10^{19}$ Nm (PPT). Es $8.2 \times 10^{14}$ Nm (GS). Felt at Honiara, Solomon Islands.			

## Significant Earthquakes of the World

## A világ jelentős földrengései

SEP 09	03 07 27.5	3.935 S	103.058 E	25	5.4	1.2	235	SOUTHERN SUMATRA, INDONESIA. mb 5.4 (GS). Two people killed and 113 homes severely damaged (VI) at Lahat. Several buildings also damaged at Jarai. Felt (IV) at Kapahiang and Pagaram and (III) at Bengkulu.
SEP 10	11 00 34.0	26.743 N	55.828 E	12 G	6.1	1.0	500	SOUTHERN IRAN. MW 6.1 (GCMT), 6.0 (UCMT), 5.8 (GS). mb 6.1 (GS). MS 6.0 (GS). ME 6.5 (GS). mbLg 6.0 (TEH). Mo $7.1 \times 10^{17}$ Nm (GS), $1.5 \times 10^{18}$ Nm (GCMT), $1.1 \times 10^{18}$ Nm (UCMT). Es $1.2 \times 10^{14}$ Nm (GS). Seven people killed and at least 30 injured in the Bandar `Abbas area. Fifteen people injured on Jazireh-ye Qeshm. Many villages damaged in Hormozgan. Felt (IV) at Ajman and Ra's al Khaymah; (III) at Abu Dhabi, Dubai and Sharjah, United Arab Emirates. Also felt at Al `Ayn and Al Fujayrah. Felt (II) at Doha, Qatar.
SEP 10	13 08 14.9	8.092 N	38.718 W	10 G	6.6	0.9	623	CENTRAL MID-ATLANTIC RIDGE. MW 6.6 (UCMT), 6.6 (GCMT), 6.5 (GS). mb 6.3 (GS). MS 6.5 (GS). Mo $8.8 \times 10^{18}$ Nm (UCMT), $7.2 \times 10^{18}$ Nm (GS), $1.0 \times 10^{19}$ Nm (GCMT).
SEP 11	00 00 02.7	1.885 N	127.363 E	96 G	6.6	1.0	463	HALMAHERA, INDONESIA. MW 6.6 (UCMT), 6.6 (GCMT), 6.5 (GS). mb 6.2 (GS). ME 6.5 (GS). Mo $9.0 \times 10^{18}$ Nm (GCMT), $8.7 \times 10^{18}$ Nm (UCMT), $8.1 \times 10^{18}$ Nm (GS). Es $1.1 \times 10^{14}$ Nm (GS). Felt (V) at Galela and Loloda. Felt (IV) at Bitung and on Ternate; (III) at Gorontalo and Manado, Sulawesi. Felt (III PIVS) at Davao and Tagum; (II PIVS) at General Santos and Zamboanga, Philippines.
SEP 11	00 20 50.9	41.892 N	143.754 E	25 G	6.8	1.1	500	HOKKAIDO, JAPAN REGION. MW 6.8 (GS), 6.8 (UCMT), 6.8 (GCMT). mb 6.1 (GS). MS 7.0 (GS). ME 6.7 (GS). Mo $1.9 \times 10^{19}$ Nm (GS), $1.8 \times 10^{19}$ Nm (UCMT), $1.8 \times 10^{19}$ Nm (GCMT), $1.7 \times 10^{19}$ Nm (PPT). Es $2.3 \times 10^{14}$ Nm (GS). Felt (IV) at Sapporo. Felt at Hakodate and Otofuke. Also felt (IV) at Misawa, Honshu. Recorded (5L JMA) in southern Hokkaido. Recorded (3 JMA) in Aomori and Iwate; (2 JMA) in Akita, Miyagi and Yamagata; (1 JMA) in Fukushima, Gumma, Ibaraki and Tochigi, Honshu. A small tsunami was recorded at Hanasaki, Hokkaido.
SEP 16	21 47 14.5	17.438 N	73.915 E	10 G	5.0	1.2	116	MAHARASHTRA, INDIA. mb 5.0 (GS). One person killed in the Daund area. At least 20 people injured, over 1,500 buildings damaged and several roads damaged by rockfalls in Satara. Buildings also damaged at Bombay. Felt (V) at Dabhol and Pune; (IV) at Bombay, Candolim, Karad, Madgaon, Mahabaleshwar, Panchgani, Pilerne, Ratnagiri and Vasco da Gama. Felt (II) in Panaji. Felt in most of western Maharashtra. Also felt in Goa and northern Karnataka.
SEP 29	15 19 31.5	29.756 S	177.683 W	36 G	7.0	1.2	524	KERMADEC ISLANDS, NEW ZEALAND. MW 7.0 (UCMT), 7.0 (GCMT), 6.9 (GS). mb 6.5 (GS). MS 6.7 (GS). ME 6.7 (GS). Mo $4.6 \times 10^{19}$ Nm (UCMT), $4.4 \times 10^{19}$ Nm (GCMT), $2.7 \times 10^{19}$ Nm (GS), $4.3 \times 10^{19}$ Nm (PPT). Es $2.6 \times 10^{14}$ Nm (GS). Felt in parts of the North Island.
OCT 05	15 52 49.4	39.533 N	73.824 E	27 D	6.6	0.8	529	KYRGYZSTAN. MW 6.6 (UCMT), 6.6 (GCMT), 6.4 (GS). mb 6.4 (GS). MS 6.9 (GS). ME 6.4 (GS). Mo $4.7 \times 10^{18}$ Nm (GS), $1.1 \times 10^{19}$ Nm (GCMT), $1.0 \times 10^{19}$ Nm (UCMT). Es $9.7 \times 10^{13}$ Nm (GS). At least 74 people killed, 140 injured and dozens of buildings destroyed at Nura. Felt (II) at Bishkek. Also felt at Osh. Some buildings damaged in Wuqia Xian, China. Felt at Kashi. Felt (IV) at Dushanbe, Tajikistan. Also felt at Gharm and Khorugh. Felt (IV) at Taraz and (III) at Almaty, Kazakhstan. Also felt at Shymkent. Felt at Islamabad, Pakistan and Tashkent, Uzbekistan.
OCT 06	08 30 45.5	29.807 N	90.350 E	12 G	6.3	1.0	434	EASTERN XIZANG. MW 6.3 (UCMT), 6.3 (GCMT), 6.1 (GS). mb 6.0 (GS). MS 6.2 (GS). ME 6.0 (GS). Mo $4.2 \times 10^{18}$ Nm (GCMT), $3.4 \times 10^{18}$ Nm (UCMT), $1.9 \times 10^{18}$ Nm (GS). Es $2.3 \times 10^{13}$ Nm (GS). Ten people killed, at least 25 injured and many structures damaged in Damxung, Doilungdeqen and Nyemo. Felt (IV) at Lhasa. Also felt at Thimphu, Bhutan.
OCT 11	09 06 10.7	43.372 N	46.254 E	16 G	5.8	1.0	472	CAUCASUS REGION, RUSSIA. MW 5.8 (GCMT), 5.7 (UCMT), 5.6 (GS). mb 5.6 (GS). MS 5.5 (GS). ME 5.6 (GS). Mo $6.6 \times 10^{17}$ Nm (GCMT), $4.9 \times 10^{17}$ Nm (UCMT), $3.7 \times 10^{17}$ Nm (GS). Es $5.4 \times 10^{12}$ Nm (GS). Thirteen people killed, more than 100 injured and 1,027 buildings damaged in Chechnya. Felt in Dagestan, Ingushetiya, Severnaya Osetiya-Alaniya and Stavropol'skiy Kray. Also felt at Krasnodar. Felt (IV) at Tbilisi, Georgia.
OCT 16	19 41 25.7	14.423 N	92.364 W	24 G	6.7	1.2	481	OFFSHORE CHIAPAS, MEXICO. MW 6.7 (UCMT), 6.6 (GCMT), 6.4 (GS). mb 6.1 (GS). MS 6.6 (GS). ME 6.0 (GS). MD 6.6 (UNM). Mo $5.7 \times 10^{18}$ Nm (GS), $1.2 \times 10^{19}$ Nm (UCMT), $1.1 \times 10^{19}$ Nm (GCMT), $1.7 \times 10^{19}$ Nm (PPT). Es $1.9 \times 10^{13}$ Nm (GS). Felt (IV) at Antigua Guatemala,

## A világ jelentős földrengései

## Significant Earthquakes of the World

										Guatemala, Mixco and Quetzaltenango: (III) at Panajachel, Guatemala. Felt at Ayutla, Chichicastenango, Ciudad Vieja, Huehuetenango, Mazatenango, Retalhuleu, Salcaja, San Marcos la Laguna, San Pedro la Laguna, Santa Catarina Pinula and Villa Nueva. Felt (III) at San Salvador, El Salvador. Felt at Antigua Cuscatlan and Ilopango. Felt (II) at Mexico and San Cristobal de las Casas, Mexico. Felt at Tapachula and Tuxtla Gutierrez.
OCT 19	05 10 33.9	21.863 S	173.819 W	29 G	6.9	0.9	518	TONGA. MW 6.9 (UCMT), 6.9 (GCMT), 6.8 (GS). mb 6.8 (GS). MS 7.0 (GS). ME 6.9 (GS). Mo $3.1 \times 10^{19}$ Nm (UCMT), $2.8 \times 10^{19}$ Nm (GCMT), $2.2 \times 10^{19}$ Nm (GS), $4.3 \times 10^{19}$ Nm (PPT). Es $5.9 \times 10^{14}$ Nm (GS). Felt (IV) at Nuku'alofa. Also felt at Ohonua, Tofoa-Koloua and Vaini.		
OCT 25	20 17 20.2&	26.533 N	54.985 E	29	5.2		210	SOUTHERN IRAN. <TEH>. mb 5.2 (GS). MS 4.8 (GS). ML 5.1 (THR). mbLg 5.0 (TEH). Nine people injured in the Bandar-e Kong area. Felt at Dubai, United Arab Emirates.		
OCT 28	23 09 57.6	30.639 N	67.351 E	15 G	6.4	0.8	365	PAKISTAN. MW 6.4 (UCMT), 6.4 (GCMT), 6.3 (GS). mb 6.3 (GS). MS 6.6 (GS). Mo $4.8 \times 10^{18}$ Nm (GCMT), $4.3 \times 10^{18}$ Nm (UCMT), $3.4 \times 10^{18}$ Nm (GS). One hundred sixty-six people killed, 370 injured and several villages destroyed in Balochistan. Several villages destroyed by landslides in the Ziarat area. A total of 3,487 homes destroyed and an additional 4,125 homes damaged in the Harnai area, Pishin and Ziarat. Felt (VI) at Quetta. Felt strongly in Bolan, Kalat and Qila Saifullah; and at Loralai, Mach, Mastung, Muslimbagh, and Surab. Felt (III) at Kandahar, Afghanistan.		
OCT 29	11 32 43.1	30.598 N	67.455 E	14 G	6.4	1.4	277	PAKISTAN. MW 6.4 (UCMT), 6.4 (GCMT), 6.2 (GS). mb 6.2 (GS). MS 6.6 (GS). Mo $5.1 \times 10^{18}$ Nm (GCMT), $4.5 \times 10^{18}$ Nm (UCMT), $2.6 \times 10^{18}$ Nm (GS). Several buildings collapsed in the Ziarat district. Cracked plaster and building damage at Quetta. One injury from a wall collapse at Shehdadkot. Felt (V) at Quetta. Also felt at Chaman, Dadhar, Dadu, Jacobabad, Jafarabad, Kawas, Khairu, Larkana, Loralai, Nasirabad, Pishin, Qambar, Qila Abdullah, Shoran, Sibi and Zhob. Felt (IV) at Kandahar, Afghanistan. Also felt at Gurgaon and Jaipur, India.		
NOV 10	01 22 02.5	37.565 N	95.833 E	19 G	6.3	0.9	432	NORTHERN QINGHAI, CHINA. MW 6.3 (UCMT), 6.3 (GCMT), 6.1 (GS). mb 6.4 (GS). MS 6.4 (GS). ME 6.4 (GS). Mo $4.0 \times 10^{18}$ Nm (UCMT), $3.6 \times 10^{18}$ Nm (GCMT), $1.6 \times 10^{18}$ Nm (GS). Es $8.8 \times 10^{13}$ Nm (GS). Three people injured, several buildings damaged and utilities disrupted at the Dameigou Coal Mine. Damage at the mine was estimated at 4 million US dollars. Several homes collapsed at Golmud. About 20 homes damaged and utilities disrupted at Da Qaidam.		
NOV 16	17 02 32.7	1.271 N	122.091 E	30 G	7.3	1.1	365	MINAHASA, SULAWESI, INDONESIA. MW 7.3 (UCMT), 7.3 (GCMT). mb 6.5 (GS). MS 7.0 (GS). ME 7.2 (GS). Mo $1.2 \times 10^{20}$ Nm (UCMT), $1.2 \times 10^{20}$ Nm (GCMT), $4.3 \times 10^{19}$ Nm (PPT). Es $1.2 \times 10^{15}$ Nm (GS). At least six people killed, 77 injured, 10,000 people displaced, 1,000 buildings damaged and communications disrupted in the Buol area and in Gorontalo. Felt (VII) at Baolan; (VI) at Gorontalo and Tolitoli; (IV) at Manado and Poso; (III) at Luwuk. Also felt at Kolaka, Kuta, Makasar, Palu and Ujung Bulu. Felt (IV) at Bandar Seri Begawan, Brunei and (II) at Darwin, Australia. Felt at Kunak and Sandakan, Malaysia and at General Santos and Koronadal, Philippines.		
NOV 22	22 27 55.1&	49.914 N	18.455 E	2 G	4.1		56	CZECH REPUBLIC. <CSEM>. ML 4.1 (GRF), 3.7 (CSEM). Two miners killed and 3 injured due to a mine collapse near Karvina. Felt at Orlova and Ostrava.		
NOV 24	09 02 58.7	54.203 N	154.322 E	492	7.3	0.8	531	SEA OF OKHOTSK. MW 7.3 (GS), 7.3 (UCMT), 7.3 (GCMT). mb 6.5 (GS). ME 7.0 (GS). Mo $1.1 \times 10^{20}$ Nm (GS), $1.1 \times 10^{20}$ Nm (GCMT), $1.0 \times 10^{20}$ Nm (UCMT), $8.0 \times 10^{19}$ Nm (PPT). Es $7.7 \times 10^{14}$ Nm (GS). Felt at Petropavlovsk-Kamchatskiy. Recorded (1 JMA) in eastern and southwestern Hokkaido. Also recorded (1 JMA) in Aomori, Iwate and Miyagi, Honshu.		
DEC 07	13 36 21.3&	26.990 N	55.800 E	15	5.4		219	SOUTHERN IRAN. <THR>. MW 5.4 (GS), 5.4 (GCMT). mb 5.7 (GS). MS 5.2 (GS). ML 5.2 (THR). Mo $1.6 \times 10^{17}$ Nm (GCMT), $1.5 \times 10^{17}$ Nm (GS). Five people injured and buildings damaged on Jazireh-ye Qeshm. Felt at Dubai, United Arab Emirates.		
DEC 09	06 23 59.7	31.232 S	176.924 W	18 G	6.8	1.1	414	KERMADEC ISLANDS REGION. MW 6.8 (UCMT), 6.7 (GCMT), 6.6 (GS). mb 6.2 (GS). MS 6.7 (GS). ME 6.6 (GS). Mo $9.1 \times 10^{18}$ Nm (GS), $1.9 \times 10^{19}$ Nm (UCMT), $1.5 \times 10^{19}$ Nm (GCMT), $2.8 \times 10^{19}$ Nm (PPT).		

## Significant Earthquakes of the World

## A világ jelentős földrengései

										Es $1.5 \times 10^{14}$ Nm (GS).
DEC 09	18	53	11.1	32.518 N	105.395 E	25	5.5	0.8	207	SICHUAN-GANSU BORDER REGION, CHINA. mb 5.5 (GS). MS 4.5 (GS). At least two people killed at Guangyuan and three injured in Lizhou.
DEC 25	20	20	51.5	23.970 N	97.569 E	35 G	4.7	1.1	67	MYANMAR-CHINA BORDER REGION. mb 4.7 (GS). Nineteen people injured, 30 houses collapsed and more than 5,400 buildings damaged in Ruili, China.

Compiled by Pamela J. Benfield and NEIC Operations Staff.



## C MELLÉKLET

# A MAGYARORSZÁGI FÖLDRENGÉSEK FÉSZEKMECHANIZMUSAINAK KATALÓGUSA

1969-2008

A vizsgált területen 1969 és 2008 között keletkezett földrengések fészekmechanizmus megoldásainak katalógusa a P hullámok első kitérés-i irányai alapján kiszámítva. A számítások Reasenberget és Oppenheimer (1985) FPFIT nevű számítógépes programjával készültek. Az  $SH_{max}$  irányok és a vetődések jellege Zoback (1992) cikke szerint lettek meghatározva. **NF**: *normálvető*; **NS**: *döntően normálvető harántvető komponenssel*; **SS**: *harántvető*; **TS**: *döntően feltolódás harántvető komponenssel*; **TF**: *feltolódás*; **na**: *nem besorolható*.

Az adatok forrása: ISC, 2007 és Magyar Földrengések Évkönyvei (1995-2008).

## APPENDIX C

# CATALOGUE OF FAULT PLANE SOLUTIONS OF HUNGARIAN EARTHQUAKES

1969-2008

An earthquake focal mechanism catalogue has been compiled for the studied territory in the period of 1969-2008. Fault plane solutions have been calculated by computer program FPFIT (Reasenberg and Oppenheimer, 1985) using P wave first motion data of the ISC bulletin (ISC, 2007) and the Hungarian Earthquake Bulletins (1995-2008).  $SH_{max}$  directions and fault types was classified according to Zoback (1992). *NF*: normal faulting; *NS*: predominantly normal with strike-slip component; *SS*: strike-slip; *TS*: predominantly thrust with strike-slip component; *TF*: thrust faulting; *na*: unknown.

	Dátum	lat	lon	strike	dip	rake	SH <sub>max</sub>	
1.	69-02-09	47.38	18.13	200	80	150		
2.	72-01-05	47.85	16.16	145	55	140		
3.	72-04-16	47.79	16.04	55	60	20		
4.	77-02-16	45.94	16.04	75	35	100		
5.	78-06-22	46.78	21.14	120	60	-170		
6.	78-06-22	46.73	21.04	10	70	10		
7.	78-09-26	47.22	18.86	100	70	-130		
8.	78-10-23	47.76	16.15	65	60	-10		
9.	81-08-29	45.78	17.64	350	20	-70		
10.	82-03-16	46.14	16.11	160	75	-20		
11.	85-08-15	47.08	18.03	0	75	170		
12.	85-08-15	47.09	18.09	227	77	-166		
13.	85-08-15	47.04	18.01	175	75	150		
14.	85-08-16	47.12	18.06	105	30	30		
15.	85-08-19	47.11	18.12	345	80	160		
16.	85-09-10	47.03	18.12	345	60	-180		
17.	88-11-29	45.60	21.53	60	50	40		
18.	88-12-21	47.80	22.54	100	60	-160		
19.	89-01-26	47.00	17.02	275	70	-160		
20.	89-01-27	47.01	16.93	110	70	170		
21.	89-02-11	47.96	16.98	30	50	20		
22.	89-02-25	47.67	22.36	40	65	0		
23.	89-06-07	48.78	19.15	165	65	-170		
24.	90-04-05	45.78	17.82	40	25	-150		
25.	90-07-18	46.17	16.55	115	20	60		
26.	91-01-10	47.71	16.14	140	60	-20		
27.	91-05-02	47.93	16.24	85	85	-40		

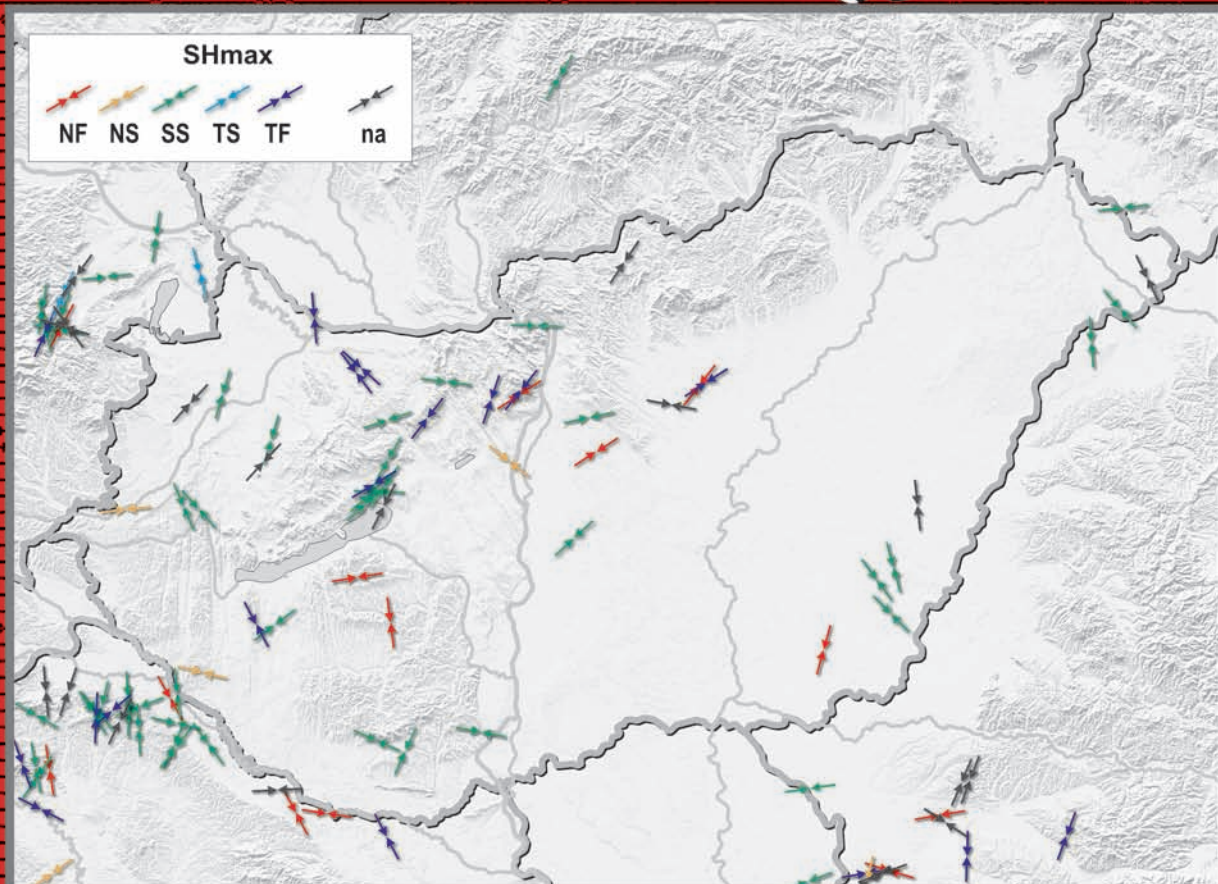


	Dátum	lat	lon	strike	dip	rake	SH <sub>max</sub>	
28.	91-12-13	45.55	21.08	335	25	-40		
29.	92-03-02	45.91	21.56	165	50	180		
30.	92-05-24	45.90	21.51	85	80	50		
31.	92-12-23	45.54	20.95	0	25	100		
32.	93-01-14	45.54	21.04	200	85	-140		
33.	93-06-01	46.19	16.49	60	85	20		
34.	93-06-05	46.19	16.71	25	65	-160		
35.	94-12-03	47.72	16.20	0	40	10		
36.	95-09-12	47.22	18.14	165	60	170		
37.	96-03-28	46.91	19.25	90	75	-20		
38.	96-10-09	45.67	22.11	85	55	50		
39.	97-03-30	47.69	16.06	75	30	40		
40.	97-04-30	45.89	16.13	160	70	150		
41.	97-05-10	48.10	16.71	50	60	10		
42.	97-05-12	45.93	16.12	125	75	-160		
43.	97-05-30	47.72	16.06	30	85	10		
44.	97-06-17	46.45	20.72	350	55	-130		
45.	97-11-27	47.26	19.38	45	55	-110		
46.	98-01-18	46.04	16.92	340	80	-160		
47.	98-01-18	46.03	16.93	165	80	150		
48.	98-03-11	47.93	16.42	120	70	-30		
49.	98-05-08	47.51	18.93	155	55	130		
50.	98-05-27	46.10	16.71	315	85	-150		
51.	98-06-02	46.05	17.12	0	70	-30		
52.	98-06-28	47.49	18.92	60	75	-80		
53.	99-01-04	47.92	22.71	0	25	0		
54.	99-03-31	46.24	16.29	325	85	-140		
55.	99-06-17	46.13	16.93	145	80	-10		

	Dátum	lat	lon	strike	dip	rake	SH <sub>max</sub>	
56.	99-09-03	46.59	21.12	270	85	170		
57.	99-09-09	46.12	18.71	55	90	-180		
58.	99-10-08	45.51	20.95	60	45	-20		
59.	99-10-13	47.47	18.75	100	25	80		
60.	00-02-27	47.54	18.48	325	75	20		
61.	00-03-12	45.76	16.16	170	35	40		
62.	00-06-28	47.79	17.68	120	30	140		
63.	00-07-22	45.74	21.41	70	85	140		
64.	00-07-22	45.77	21.38	70	55	-110		
65.	01-06-27	47.72	16.16	15	70	-120		
66.	01-07-01	47.72	16.18	5	85	80		
67.	01-08-02	45.51	20.96	0	5	-60		
68.	01-08-26	47.39	18.37	100	55	50		
69.	02-02-23	46.25	16.93	220	80	20		
70.	02-10-23	47.54	20.04	115	50	40		
71.	02-10-25	46.54	17.38	45	75	70		
72.	02-12-06	46.17	16.65	220	85	-30		
73.	03-06-27	47.53	20.00	30	30	-100		
74.	03-08-09	46.99	16.59	115	65	-40		
75.	03-08-31	46.08	18.10	335	70	-20		
76.	03-09-21	45.87	17.53	35	85	-140		
77.	03-11-29	45.92	16.20	35	30	-40		
78.	03-12-02	47.77	19.02	220	75	150		
79.	03-12-16	46.34	17.07	135	55	-40		
80.	03-12-31	46.04	18.27	155	85	160		
81.	04-05-18	45.69	18.17	40	50	60		
82.	04-05-25	47.47	17.14	240	85	0		
83.	04-06-25	47.43	16.95	90	35	30		

	Dátum	lat	lon	strike	dip	rake	SH <sub>max</sub>	
84.	04-08-17	47.57	17.94	45	60	80		
85.	04-08-18	47.59	17.97	55	60	110		
86.	05-03-26	46.54	17.49	5	90	160		
87.	05-04-13	46.56	18.17	130	40	-140		
88.	05-05-14	46.24	16.16	60	75	60		
89.	05-05-16	47.29	17.44	50	80	-40		
90.	05-08-02	46.14	16.46	105	30	110		
91.	05-08-30	46.23	16.64	210	80	-40		
92.	05-09-30	46.74	17.97	80	50	-90		
93.	05-12-07	46.17	16.46	5	70	20		
94.	05-12-09	46.16	16.44	185	80	-30		
95.	06-01-08	45.50	16.24	20	55	-140		
96.	06-09-15	47.45	19.83	90	35	-150		
97.	06-11-23	48.21	22.58	130	80	-10		
98.	06-12-31	47.40	19.34	125	55	20		
99.	07-07-09	46.13	16.60	75	85	-40		
100.	07-07-27	46.23	16.89	195	30	-40		
101.	07-09-20	45.51	20.61	25	90	170		
102.	07-11-18	48.03	19.55	90	75	-60		
103.	07-12-16	47.03	21.29	185	10	0		
104.	08-01-18	47.21	17.43	100	40	40		
105.	08-02-07	45.86	20.66	130	85	-20		

A magyarországi földrengések fészekmechanizmusai (1969-2008)  
Fault plane solutions of Hungarian earthquakes (1969-2008)



Részletek a C mellékletben / See details in Appendix C